the

Journal

of the association for physical and mental rehabilitation

CORRECTIVE THERAPY

NOVEMBER–DECEMBER, 1960 VOL. 14, NO. 6

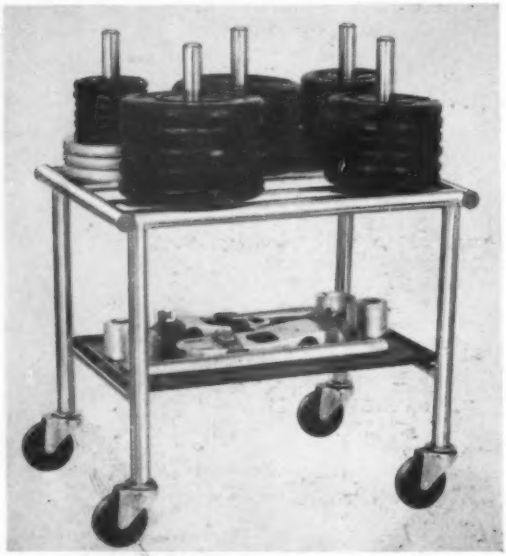
PRESTON®

A Complete Line

FOR PHYSICAL MEDICINE AND REHABILITATION

Your one source for all your needs

PRESTON SOLVES YOUR WEIGHT STORAGE PROBLEM!



Now . . .

The Preston Weight Caddy*

Saves You

Effort • Time • Space

No more storage and transportation problems with P.R.E. weights. No more bending and carrying heavy weights by hand to the patient. No more tripping over weights on the floor: The mobile Preston Weight Caddy holds your weights at your finger tips.

The Preston Weight Caddy allows weights to be conveniently and centrally stored in any corner or closet, in a minimum of space. Yet the complete weight selection can be wheeled quickly and without effort to the treatment table. In larger treatment areas the Caddy can be easily moved from table to table as required, serving all with efficiency and economy of time and space. Holds up to 300 lbs. of weight plates in 1¼ lb., 2½ lb., 5 lb., 10 lb. and 25 lb. sizes; also the small aluminum weights and miscellaneous accessories. Requires only 2 square feet of floor space.

The Preston Weight Caddy is built to seat level, the most convenient height for the administration of a weight program. It is no effort at all for the therapist, sitting on a chair or stool, to apply weights to exercise boots.

The Preston Weight Caddy moves on 3" ball-bearing heavy-duty swivel casters. Its chrome-plated tubular steel frame is attractively designed and ruggedly constructed with all welded joints. For extra sturdiness the legs are reinforced with an H-Brace. A conveniently located lower wooden shelf may be used to store exercise boots, bars, collars, etc.

ORDER BY CATALOG NUMBER

PC 2043 — Preston Weight Caddy — on 3" ball-bearing casters with five weight holders and utility shelf, all-welded chrome-plated construction, 20½" x 15" x 26" overall height **$54.50**

Weights, if needed, must be ordered separately:

PC 2041 — Iron Weight Plates, Slotted, 1¼ lb., 2½ lb., 5 lb., 10 lb., and 25 lb. ..... per lb. **.30**

PC 2038 — Aluminum Weight ¼ lb. **$ .75**

PC 2039 — Aluminum Weight ⅝ lb. **1.25**

*T.M.—Design Patent applied for

EXCLUSIVE DISTRIBUTORS THROUGHOUT THE U.S. AND FOREIGN COUNTRIES

J. A. PRESTON CORPORATION

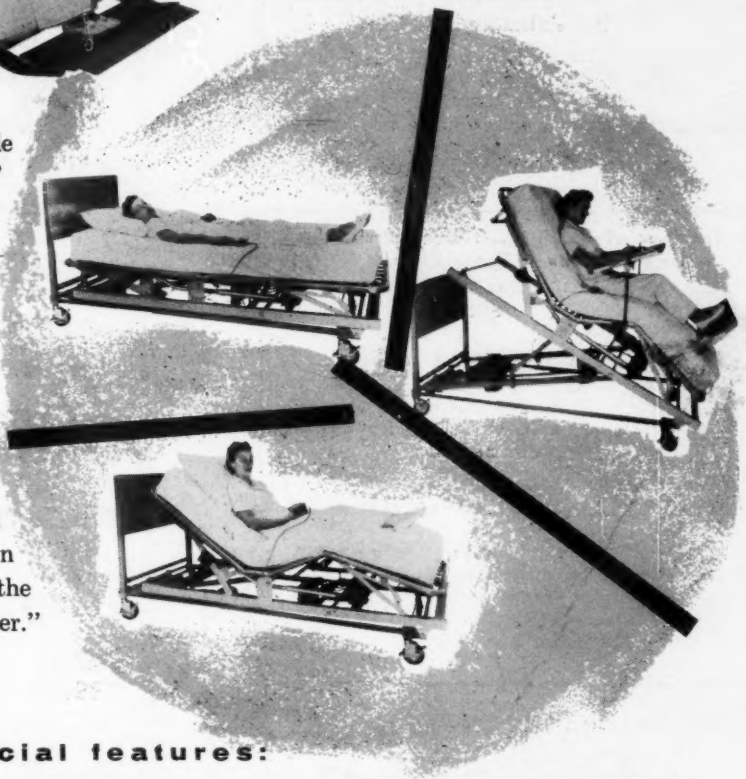
175 Fifth Avenue, New York 10, New York

FRANKLIN

A New concept in Hospital beds

Four years of research and clinical application are behind this announcement. Now—significant evidence introduces a new phase in the therapeutic treatment of cardiac complications, post surgery, geriatrics and general physical therapy—utilizing the functional applications of the new "FRANKLIN" hospital bed.

Versatile and adaptable the "FRANKLIN" bed applies the proven therapeutic principles by placing the patient in the best possible positions for exercising and rehabilitation. Aids in balance and co-ordination ...promotes natural circulation and gravity drainage. In effect "helps to get the patient on his feet earlier."



Special features:

A full range of adjustments, from 10° Trendelenberg to 90°, possible by either operator or patient, with just the press of a switch. Improved low height of only 18 inches—Complete line of accessories.

DISTRIBUTED BY

THE JOHN BUNN CORPORATION

MANUFACTURERS AND DISTRIBUTORS OF SPECIALIZED HOSPITAL EQUIPMENT AND SUPPLIES

163 Ashland Avenue, Buffalo 22, New York **Telephone: Elmwood 2795**

AVAILABLE NOW

DIRECTIONAL GOALS FOR CLINICAL THERAPY EXPERIENCES

Carl Haven Young, Ed.D.

A Guide for achieving affiliation of educational and clinical institutions for the purpose of providing clinical experiences for therapy trainees.

Published and distributed exclusively by The Association for Physical and Mental Rehabilitation.

39 pages, 5½" x 8½". Paper. $1.00.

HOYER LIFTER
FOR HOME AND HOSPITAL

FOR FURTHER INFORMATION WRITE
DEPT. AM-3 TED HOYER & CO., INC.
BOX 949, OSHKOSH, WISCONSIN

For Treatment of Spastic Cases • Cerebral Palsy
Stroke • Polio • Hand Injuries

PHYSICAL THERAPY

GENERAL ELECTRIC CO.
SILICONE

Bouncing Putty

Does Not Harden
Lasts Indefinitely
Can Be Autoclaved

As A "Trial Order"
Send $2.00 for One $2.85 Jar

S. R. GITTENS, Distributor
1620 Callowhill Street, Philadelphia 30, Pa.

Handicapped Drivers!

DRIVE YOUR CAR
—SAFELY
—EASILY
with new improved Mechanical
GAS & BRAKE
HAND
CONTROLS
$39.50
Plus Postage with copy of this ad

KITS CAN BE INSTALLED IN 2 HOURS

Here's the greatest development in handicapped driver controls. One lever does both operations — works both brake and gas — makes your car absolutely fool-proof. The slightest touch of your fingers now operates your car. Other units selling at more than three times our price cannot give better performance. We guarantee this on a money-back basis. Thirty years' experience in building automatic clutch and brake controls is behind this guarantee. CALL OR WRITE FOR FREE PAMPHLET.

Brake Center, Inc.
Chas. Libby, Pres.

3716 QUEENS BLVD.
LONG ISLAND CITY
NEW YORK
STillwell 4-6417

NOE'S GRADUATED XERCISORS

SIX MODELS

Resistance from 27 to 200 lbs. Extra light model with 3 lb. minimum resistance for rehabilitation of invalids and hospital patients.
Discount to Hospitals and Doctors.

For free descriptive literature and information, write to:

ROY H. NOE
739 N. Auburndale, Memphis, Tenn.

The Journal of the Association for Physical and Mental Rehabilitation

NOV. - DEC., 1960

VOLUME 14 No. 6

Published Bimonthly
by the Association for
Physical and Mental Rehabilitation
105 St. Lawrence Street
Rehoboth Beach, Delaware

in this issue

EDITORIAL BOARD

John E. Davis, Sc.D. ..... Rehoboth Beach, Del.
Edward D. Greenwood, M.D. ..... Topeka, Kans.
Richard L. Jenkins, M.D. ..... Washington, D. C
Lewis A. Leavitt, M.D. ..... Houston, Texas
Jack Meislin, M.D. ..... Montrose, N. Y.
Carl Haven Young, Ed.D. ..... Los Angeles, Calif.
Arthur H. Steinhaus, Ph.D. ..... Chicago, Ill.

EDITORIAL STAFF

EDITOR
Roger H. Wessel
Box 478, Montrose, N. Y.

EDITOR EMERITUS
Everett M. Sanders
So. Sudbury, Mass.

ASSOCIATE EDITORS
Marthann Doolittle
Thomas J. Fleming
J. Robert Macaluso

CONTRIBUTING EDITORS
Thomas K. Cureton, Ph.D., Urbana, Ill.
Ernst Jokl, M.D., Lexington, Ky.
Peter V. Karpovich, M.D., Springfield, Mass.
Dana M. Street, M.D., Memphis, Tenn.
Raymond A. Weiss, Ph.D., New York, N. Y.
William R. Pierson, Ph.D., Los Angeles, Calif.

DEPARTMENT EDITORS
BOOK REVIEWS AND ABSTRACTS
Philip J. Rasch, Ph.D.

CHAPTERS
Richard G. Fowler

PRODUCTION EDITOR
Harold McCormick

CIRCULATION MANAGERS
Edward Mecchella William Kultzow

ADVERTISING MANAGER
John J. Marquette
66 Stone Ave., Ossining, N. Y.

SUBSCRIPTION RATES

Subscription to the Journal is included in Active, Professional, and Associate memberships.
Subscriptions to libraries and organizations $5.00
Foreign $5.50
Single Copies $1.00

Address all requests for subscriptions to:
Edward F. Mechella, Circulation Manager,
Box 478, Montrose, N. Y.
Copyright 1960 by the Association for
Physical and Mental Rehabilitation

ARTICLES

Investigation of Hypertrophy of the Skeletal Muscle — Werner W. Siebert 153

Ambulation with Pylons and the 'Faulty' Gait — Manfred R. M. Blashy, M.D., John Tanzine, C.C.T. and Joseph Oldham, C.O. 158

The Effect of Low-Resistance, High-Repetition Progressive Resistance Exercise Upon Selected Measures of Strength and Flexibility — Ralph L. Wickstrom, Ph.D., C.C.T. 161

Some Personality Attributes of Champion Amateur Wrestlers — Philip J. Rasch, Ph.D., F.A.C.S.M. and M. Briggs Hunt, Ed.B. 163

Work Therapy for the Handicapped — Julian Vogel, C.C.T. 165

Recreation Service for the Aging — Jay S. Shivers, Ph.D. 168

DEPARTMENTS

CHAPTER ACTIVITIES 167

FROM OTHER JOURNALS 174

BOOK REVIEWS 175

NEWS AND COMMENTS 177

INDEX, VOL. XIV 178

CLASSIFIED DIRECTORY ..... Back Cover

THE JOURNAL OF THE ASSOCIATION FOR PHYSICAL AND MENTAL REHABILITATION

Information For Contributors

MANUSCRIPT: Manuscripts should not exceed ten (10) typewritten pages; approximately 5,000 words. Manuscripts must be the original copy, not a carbon, typed double-spaced with margins of one (1) inch for large type and one and a half (1½) inches for the small.

STYLE: Prepare manuscripts in conformity with the general style of the Journal. Retain a copy of the manuscript and duplicates of all tables, figures, charts for future use should originals be lost in the mails.

ILLUSTRATIONS: Drawings and charts should be made with India ink for photographic reproductions as zinc etchings. Photographs must be 8 x 10 inches, high contrast, black and white, glossy prints. Printed captions and related information referring to photographs, must be typed and attached to the bottom of the photograph. In accepting an article for publication the association agrees to defray the costs of one (1) photo engraving or line cut used for illustration purposes. Cost of additional engravings must be charged to the author.

REFERENCES: References in the text should be identified by number, *i.e.*, "As Observed by Kendall and Jones (4). All references should be listed at the end of the article in numerical sequence. The following order and punctuation should be observed: Kendall, B.S. and J.E. Jones, Resume of Treatment of Brain-Damaged Cases. *Arch. Neurol. and Psychiat.*, 71:247, June, 1948.

Send all manuscripts to the Editor, Box 478, Montrose, N. Y.

REPRINTS: Should be ordered when manuscript is submitted. They may be purchased at the following prices:

No. Pages	100	200	300	400	500	1 M	100 Add.
1	$ 8.15	$ 9.70	$10.95	$12.20	$13.45	$18.75	$ .95
2	11.55	13.15	14.70	16.25	17.80	24.70	1.25
3 - 4	14.70	16.90	19.05	21.25	23.15	32.50	1.90
5 - 8	28.15	38.15	44.40	50.65	56.90	81.25	5.00

REPRESENTATIVE ASSEMBLY

Eastern States—Leo Berner, 21-02 67th Ave., Bayside, N. Y.

West N. Y.—Warren N. Landon, 22 So. Main, Manchester

Mid Atlantic—George M. Kilmer, V.A.H., Ft. Howard, Md.

Mid-West—Leslie M. Root, 2142 N. 61 St., Wauwatosa 31, Wisc.
Carl Peterson, 4728 N. Virginia, Chicago 25, Ill.

Northwest—Samuel G. Hewston, V.A.H., American Lake, Wash.

Calif.-Nevada—Bernard H. Weber, 7631 Willis Ave., Van Nuys.

Evangelo Gerontinos, 1781 Bogan Avenue, Mountainview.

Ernest G. Saenz, 5214 Selmaraine Dr., Culver City.

Central States—George Jurcisin, V.A.H., Chillicothe, Ohio.

New Eng.—George Heos, Box 256, Astor Station, Boston 23, Mass.

So. East—John Bozovich, VA Hospital, Bay Pines, Fla.
Paul B. Bell, 1143 Getwell, Memphis, Tenn.
William Redden, V.A.H., Lake City, Fla.

Texas-La.—John J. Arena, 5037 Rapido St., Houston 21, Texas.

Ht. of America — Robert O. Swengel, 2605 Murrow Ct., Topeka, Kans.

Grand Canyon—Henry White, 2142 Terra Suida Drive, Salt Lake City, Utah.

OFFICERS

CARL HAVEN YOUNG, Ed.D. — PRESIDENT
3231 Coolidge Ave., Los Angeles 66, Calif.

RICHARD G. FOWLER — PRESIDENT-ELECT
3586 Tilden Ave., Los Angeles 34, Calif.

DAVID SER — VICE PRESIDENT
4301 46th St., Long Island City 4, N.Y.

CARL H. ALSBERG — VICE PRESIDENT
9158 McLennan Ave., Sepulveda, Calif.

JULIAN VOGEL — VICE PRESIDENT
V.A. Hospital, Waco, Texas

JOHN B. MURPHY — SECRETARY
Rte. No. 3, Chillicothe, Ohio

VINCENT ODDO — TREASURER
4839 W. Dakin, Chicago 41, Ill.

ROGER H. WESSEL — DIRECTOR OF PUBLICATIONS
Box 478, Montrose, N.Y.

NORMAN N. TENNER — PAST PRESIDENT
8557 N. Drake Ave., Skokie, Ill.

JOHN E. DAVIS, Sc.D. — EXECUTIVE DIRECTOR
105 St. Lawrence St., Rehoboth Beach, Delaware

HARRY B. DANDO — CHM., CERTIFICATION COMM.
1092 Fairmont St., St. Paul 5, Minn.

ADVISORY BOARD

JOHN E. DAVIS, Sc.D., Secretary

JOHN H. ALDES, M.D. — Los Angeles, Calif.
RUFUS ALLDREDGE, M.D. — New Orleans, La.
FOLKE, BECKER, M.D. — Dublin, Ga.
THOMAS K. CURETON, Ph.D. — Urbana, Ill.
TEMPLE FAY, M.D. — Philadelphia, Pa.
EVERILL FOWLKS, M.D. — Portland, Ore.
FRITZ FRIEDLAND, M.D. — Boston, Mass.
EDWARD GREENWOOD, M.D. — Topeka, Kans.
HAROLD M. HILDRETH, Ph.D. — Arlington, Va.
A. B. C. KNUDSON, M.D. — Washington, D. C.
MELVIN J. MAAS, Maj. Gen. USMCR Ret. — Washington, D. C.
KARL MENNINGER, M.D. — Topeka, Kans.
DONALD MUNRO, M.D. — Boston, Mass.
LOUIS B. NEWMAN, M.D. — Chicago, Ill.
WINTHROP M. PHELPS, M.D. — Baltimore, Md.
HARVEY J. TOMPKINS, M.D. — New York, N. Y.
JOSEPH H. VAN SCHOICK — Washington, D. C.
STAFFORD L. WARREN, M.D. — Los Angeles, Calif.

COMMITTEES AND CHAIRMEN

COORDINATOR: Carl H. Young, Ed.D.

STANDING COMMITTEES: AWARDS: George V. Devins; CERTIFICATION: Harry Dando; CHAPTERS: Frank S. Deyoe; CONFERENCE: Paul E. Roland; CONSTITUTION: Paul E. Roland; MEMBERSHIP: Bernard H. Weber; NOMINATION: Carl B. Peterson; PROFESSIONAL STANDARDS: Arthur Landy; PUBLIC RELATIONS: David Ser; SCHOLARSHIP: Carl H. Alsberg; EDUCATION: Ivan W. Swisher, Ed.D.

ADMINISTRATIVE COMMITTEES: ADVERTISING: John J. Marquette; EXHIBITS: Bernard H. Weber; LEGISLATIVE: George W. Jones; LIAISON: John J. Arena; POSITION STANDARDS: Zane E. Grimm; PLACEMENT: Julian Vogel; RESEARCH: Oscar H. Ciner, Ed.D.; STANDING COMMITTEES: Daniel Bennett; SALARIES: Everett G. Converse.

INVESTIGATION OF HYPERTROPHY OF THE SKELETAL MUSCLE*

WERNER W. SIEBERT

(TRANSLATED BY ROBERT KRAMER**)

It is well known that increased activity may enlarge skeletal muscle. Lamark has previously described this. Darwin and Heackel have paid such phenomenon particular attention, and we are indebted to A. Fick for his various far reaching observations and for the consequently formulated physiological laws.

Today's concept in that matter is primarily based on Roux. He summarized voluminous researches dealing with resulting muscle enlargement through increased activity and all the closely related effects from the viewpoint of "functional adaptation," and understood by that "the adaptation of the function through its execution." Authors after Roux who investigated that subject were dominated largely by Roux' point of view. A major change of his theories and teachings was not brought about.

The resulting enlargement of the muscle through increased activity is a true hyperthrophy according to Virchow, which is the addition of evenly formed parenchymal particles within the cells. Roessle has defined it even more closely by stating:

> The true hypertrophy is an enlargement of the nucleus and protoplasm by new growth and an enlargement of the specific endocellular structures, and is not to be mistaken for a simple swelling such as an edema . . . with increased flow of nutritious material or by any other liquification of the medium, which however may occur also in the first stages of hypertrophy.

Later on there will be a further discussion of a possibility of hyperplasia (the creation of new cells) through increased activity of the muscle.

The expression "activity hypertrophia" means that hypertrophy is a direct result of the activity of the organ, and originated with Recklinghausen. Roux differentiated between physiological, functional adaptation without a change of shape and volume, and a morphological one with a change. The former is entirely an improvement of the quality of the organ so that it may be able to do more work than before. The latter is a multiplication of the substance in which the new addition of the material has to be at least equal to the original old substance. It is very likely that with the quantitative adaptation, a qualitative one takes place. In this study we are only concerned with the increase of the volume of the muscle which of course is a morphological adaptation. Any possible qualitative changes are of interest only insofar as they are indicative to the study of the quantitative conditions.

In the field of the morphological adaptation Roux considered the question of "dimensional adaptation" of prime importance.

Hypertrophy of the skeletal muscle, according to his investigations may come about as increase of length as well as thickness of the muscle. The latter is under normal conditions the usual, such as in accelerated work, in the Gymnasium or at the Sportsfield, etc.

A lengthening of muscle fibers, however, does not take place (Roux, Lange, Morpurgo, Schiefferdecker and others). Such will be effected under one condition only, which is to move apart the point of origin of the tendons either by pathological processes or experimentally and fixate them in their new location (Roux, Strasse, Joachimsthal and others).

Roux derived from such muscle behavior the rule of "dimensional adaptation" and expressed it as follows: "Increased activity enlarges an organ only in such parts that are actively putting out the increased activity." We are discussing in this paper only the increase in thickness, because that is what is understood as "hypertrophy." However, strictly speaking it may also include an increase in length of the muscle.

"Does every increase in activity lead to work hypertrophy?"

From the explanation of A. Ficks and furthermore from Roux and especially from his pupil Lange, we find that work hypertrophy and work do not always mean the same. For instance if two sprinters of equal weight are running the same distance, it is assumed that they are putting out the same amount of work, but the first sprinter will have used a much shorter time. Therefore, within the time unit he will have done more work. Work ÷ Time = Effort: that means the first sprinter has put out a greater effort than the second one.

---

*This article, one of the classics in the literature of muscle physiology, is frequently quoted by modern authorities. It appeared originally in *Zschr. klin. Med.*, 109:350-359, July, 1928, the text in German.

**Chief, Corrective Therapy, V.A. Hospital, Sheridan, Wyo.

As I have mentioned before the opinions of Roux and Lange may be narrowed down to the fact that in regard to the development of hypertrophy, one must differentiate between increased activity through accumulation of work total on one hand and the accumulation of effort on the other. It is the accumulation of effort that plays the important part here.

Such differentiation has so far not received enough attention. In modern sports literature, which does pay attention to it, the opinions concerning the influence of increased activity on hypertrophy are quite divided.†

The reason for such contradictions lies apparently in the difficulties of evaluating correctly the influence of sports and physical activities on muscle development. One will seldom meet clear-cut testing and measuring conditions. That means the influence of a single activity on muscle development. Let us for instance take the example of sprinting. Sprinters specializing in 100 meters will, in their training, not always sprint 100 meters. There will be periods of short spurts of speed for shorter distances and rather slower runs for longer distances. Thus, strenuous and easier efforts are being alternated. Besides track and field, men do not confine their training and competition to one event only, as mentioned purely theoretically with the 100 meter sprinters. They also swim, jump, and engage in other activities in and out of competition. Therefore, an exact measurement of just one activity's influence is made rather impossible. Muscle changes created by one type of activity may be modified by another one.

Furthermore, one is only able to measure the muscle thicknesses by measuring the circumferences of the extremities. Besides the differences in skin and tissues, there is also a flaw in that method, because only complex muscle groups can be judged, whose single members may not have been equally participating in the overall use.

Such difficulties may be avoided through the use of experiments with animals. I have conducted experiments with laboratory rats, who had to execute certain running exercises in an electrically driven drum.

Roux and Lange manipulated with both variables, effort and work total. If one wishes to examine experimentally the truth of their conclusions, one must keep one of their variables constant, while the other one may be changed.

Thus in the first series of experiments the work total of all animals was kept constant, while the effort was changed through variations of the speed of running. At the end of the experiments of one half year the animals were killed, and their hearts as well as the skeletal muscles which were particularly involved in the work of running were weighed. The results of these investigations were previously published. They showed that animals with equal work totals but greater effort had heavier hearts and heavier skeletal muscles (Gastrocnemius).

In the second series of experiments the effort was to be kept constant while the work total was to be changed. As in the first series, rats of the same lineage and as nearly as possible same body weight were evenly divided into three groups. The animals of group A (9 animals) ran for 3 months, one hour daily, the one of group B (8 animals) 3 months, 3 hours daily, and the one of group C (8 animals) 6 months, 3 hours daily. The speed, thus the effort, was kept equal for all of the three groups, *i.e.* 9 meters per minute. At the end of the experimental period again all animals were killed and as in the first experimental series weighed and registered.

The average weights are shown in Table 1.

The conditions were thus in general the same with all three groups. A growth of muscles with increased time of activity, such as the work total could not be observed. Also the dry substances of the gastrocnemius showed no difference. (on the average in group A, 24.10; in group C, 23.92)

Now that the experiment showed to be in agreement with Roux and Lange that not the work total, such as the time of activity, but the *effort* to be the decisive factor in the appearance of hypertrophy, (so is) still a certain minimum of work total, such as durance or in other words repetition of the effort necessary until the muscle has developed its substance completely. In that case activity duration does play a part in the development of hypertrophy. However if a certain minimum level of activity is overstepped, an additional growth in hypertrophy takes place only when a further effort is achieved, but not when the previous effort continues on the same level. I had not determined in my experiments this minimum level since its size was irrelevant for the answer I was looking for. I had selected a level which I assumed to be somewhere above the minimum. That such a selection by me was correct is proven by the result of the last described experiment; therein no change occurred in the muscles even when the activity (runs, sprints) was continued. So far in this paper we have considered work a purely physical measureable con-

†Quite in agreement with Roux and Lange, the statements of Herzheimer are here mentioned concerning only the behavior of skeletal muscles while running (sprinting).

TABLE I

Group	Time of Activity	Body Weight	% of Body Weight	
			Heart	Gastrocnemius
A	3 months, 1 H daily	221	3.57	6.10
B	3 months, 3 H daily	226	3.57	6.26
C	6 months, 6 H daily	230	3.55	6.20

ception as a cause of hypertrophy. Nothing was said, about the form or style in which the muscle functions.

It is not without interest, to study the different physiological activity types concerning their influence on hypertrophy. It involves here two main types: isotonic and isometric muscle action, which means, activity of the organ with and without the possibility of muscle fiber shortening, without and with tension changes. In its pure form, or at least nearly so, both types of activity may only be realized in an experimental way, because all natural movements which we execute daily are composed of ever changing parts of both.

Now Moritz has stated for the heart muscle, activity, especially that with a possible large isometric component, may lead to hypertrophy. That does not necessarily hold true for the skeletal muscle, since the condition and circumstances of the heart and its actions cannot be simply applied to other muscles. However a series of facts speaks for Moritz' opinion. For instance, it is known that through simple innervation, arm muscles of joints which are being held stretched and inactive, are being enlarged in their circumference rather quickly and considerably. Certain training systems, such as that of Sandow, are using that known phenomena, to produce especially large muscles.

Therefore an exact comparison of isometric and isotonic reflex is only possible if the strength and frequency of the introduced impulse is kept constant.

I demonstrated this in an animal experiment with frogs, by electrically stimulating their gastrocnemii.

The muscle of one side of the frog was put into an isometric action while the muscle of the other side was put into an isotonic one by an electric current of the same intensity and duration.

Nothnagel has previously used electrical stimulation for the study of hypertrophy; however he did not compare isometry and isotony in his investigations. The frogs were tied down carefully on a surgical table board. For the isometry I fixed the foot joint in dorsal flexion and the fixation of the knee joint in stretched position, so that a shortening of the muscle might not take place. For the isotonic action a possibility of contraction was allowed to the muscle. One electrode was connected directly to the gastrocnemius, while the other electrode was placed most nearly to the iliacus at the thigh. The stimulation of the isotonic and isometric actions was done with the same current intensity and frequency of the impulses: Induction current 2 V., 10 cycle, short tetanic contractions. Stimulation duration 3 seconds, then 3 seconds rest, then again 3 seconds stimulation, etc. For each leg 20 minutes per day. The experiments lasted for 14 days. If they would last longer the animals would have died. After the last electrical stimulation the frogs were kept for three days in resting condition, and then killed. At once the gastrocnemii were carefully extracted and weighed. Results appear in Table 2.

The isometrically stimulated muscles were heavier from 4 to 26%. (on the average 13%) than the isotonic ones.

Experiments similar to those with the frogs have

isometric stimulated muscle gr/	isotonic stimulated muscle gr/	Percentage increase isometric isotonic %
1,0330	0,8198	26
0,7240	0,6927	4
0,8431	0,7273	15
1,1830	1,1053	7
0,9634	0,8623	11
0,9650	0,7998	20
0,9243	0,8383	10

TABLE II

also been made with a number of rats. The duration of the faradization (electrical stimulation) was twice daily for ½ hour, for ¼ of a year. Unfortunately quite a number of experimental subjects had to be eliminated, because rats do not take electrical stimulations as patiently as frogs do. They executed a considerable amount of defensive movements with their tied extremities, which must be considered further exercises. However, in the rats which did not resist the isometric active muscles again were heavier than the isotonic ones. Thus, the stated information made by Moritz was also valid for the muscles of the extremities.

At the relatively short duration frog experiments, the exception may be raised that the increase in weight may in itself not be a hypertrophy but an accumulation of fluid in the muscle. After all, since Ranke, it has been proven many times that water increases in a tired muscle. (Buglia, Schwarz, and many more). However, as Embden and Jost have found, water accumulation disappears completely during the following rest period. After 24 hours the SC authors found a weight difference of 1% at the most, between the stimulated and non-stimulated muscle.

At our frog results we found clear weight differences (up to 26%) even after 2-3 days, thus after an amount of time when a complete recovery of a muscle may be assumed. Should such a weight change be really attributed to only water accumulation, then it cannot be the same which is described by Ranke; it would be in our case a persistent one, which can be assumed to be very closely related to hypertrophy. Roessle himself has pointed out the increased fluid penetration of the muscle is the beginning of the hypertrophy phenomena; inasmuch as there appears to be a very close relationship between fluid infiltration of the tissue and its growth. Such has been proven many times. I wish to point out for instance, Walters' investigation on plant material and Davenport and Schaper's finding on animal material (tadpoles). To such statements also belongs the fact, that in infancy, a time of rapid growth, the tissues are very rich in fluid in comparison to other age periods (see Rubner, Cerny, and others). I am far from the opinion, that a fluid accumulation should generally be interpreted as a growth process. However, if we see an increase of fluid in the tissue under conditions such as in our case of accelerated activity which leads to certain growth, so one may assume the above mentioned close relation between increase of fluid in the muscle tissue and growth, hence we are dealing here with the first phase of the growth phenomena; in our case, of course, with the process of hypertrophy.

Hypertrophy or Hyperplasia

During the previous mentioned statement about anatomical changes I left the following question unanswered: Does the muscle enlarge under increased work on account of enlargement of the individual muscle fiber (actually hypertrophy) or does an entire new formation of muscle fibers take place?

This question has been answered in the literature quite differently by different investigators. Earlier authors such as Zenker, Klebs, Rokitansky, Roux, Zielonko under Virchow's leadership and others decided, for the theory of fiber multiplication, while Nothnagel, J. Loeb, Schwalbe and Mayeda, Tangl and others assumed a mere hypertrophy. Even today the opinions are widely divided, so that an investigation of this point appears to be called for, inasmuch as present research material does not prove convincing.

This question can only be answered by an exact count of muscle fibers. So far as such a count concerns the heart muscle and segments of skeletal muscles, a conclusion from a small part to the whole would be a weak assumption for several reasons. Frequently there may be an uneveness of the fibers in the cross section which may not always be muscle fibers themselves, etc. Also it would require drawing a conclusion from the absence of mitoses to a nonexistence of new formation processes of fibers. After the adaption of a muscle to a greater effort, and after continuation of such effort, a further increase of the muscle does not take place; therefore should the experiment later be discontinued, mitoses do not necessarily have to be present even if the growth or increase of the organ was caused by their formation of them. It is best, then, to produce hypertrophy in one extremity muscle and use the same muscle of the opposite extremity as a control without letting it work at all. After that, crosscuts should be made on both muscles at the same place, and all the muscle fibers be counted and compared.

Morpurgo made such experiments under very exact conditions. He removed from two full grown dogs the sartorius of one side. He made a cross cut exactly in the middle and counted the muscle fibers. After the wound was healed the dogs were trained to run in a treadmill, which was driven mechanically only in the beginning. Later on the animals ran the treadmill in accordance with their strength, spontaneously and without mechanical help. From time to time they rested but then ran again. The experiment lasted for two months. After that the other sartorius muscle was removed. It showed after careful

examination that the amount of muscle fibers were the same in both muscles, *i.e.* the one that did all the exercise and one that was removed before the exercise. An increase in the amount of muscle fibers did therefore not take place.

This exact investigation is the only one found in the literature. According to my knowledge neither before him nor after Morpurgo was this question investigated in such a way. Only Schieferdecker has, at least partly, undertaken an examination of Morpurgo's findings. He did it by a recount of the original preparations (crosscuts of the muscles) but he did not repeat the whole experiment. However, he found the same amount of muscle fibers.

Despite their impressive importance however, Morpurgo and Schifferdecker's investigations do not answer the question in all directions. Morpurgo's dogs performed work output which certainly was more of the duration type than of the effort type according to our previous explanation. But if the latter type does especially create hypertrophy, and if the muscle reacts to heavy work with hypertrophy only (with hyperplasia) this cannot be decided from Morpurgo's experiments. It must also be remembered that Morpurgo performed his experiment with adult animals where the tendency to division of tissue particles is less than in younger subjects.

My own investigations took care of both points. From a series of experiments which I have since done and described concerning the behavior of other muscle tissue particles, I shall quote here the results of an experiment with two young animals:

Both animals were from the same litter and were three to four months old at the beginning of the experiment. I kept them first in a small kennel for three weeks at rest, as much as possible. Then I removed under anaesthesia the sartorius of both dogs from the same side and assiduously prevented contraction of the muscle while operating. A special apparatus to prevent contraction of the muscle was used. The muscles were fixated twice for 24 hours in a mixture of trichloracetic acid (trichloraceticacid, iceaceticacid aa, 15 of 100 cm., 85% alcohol). After completion of such preparation, I made a colloidin-paraffin impression from the midsection of the muscle which was previously determined and marked in position. Then I made a cross section of 10 microns.

The work of the dogs was done in a treadmill which was set at an angle. The effort was increased slowly up to 10 km at a 33° angle in 1½ hours, the animals carrying a load equivalent to 20% of their body weight. The feeding consisted of mixed food which was sufficient but not too much. The experiments lasted for six months. After conclusion of the work period the animals were given three days rest. Then I removed the other sartorius and prepared it exactly like the first one. The cross sections were dyed according to Heidenhain and greatly enlarged michrophotograms were prepared from each field of view so that each and every muscle fiber cross section was easily visible. It is sufficient to take negatives on a light-sensitive paper, thus permitting an exact count. For the selected enlargements, about 40 to 45 pictures, size 24x30 cm. had to be prepared of each muscle transsection. They then were put together, in order to see that no micro area picture was taken twice, and that the markers were put in the right place so that no muscle fiber could be counted more than once. After that, picture by picture was checked and for every muscle fiber crosscut, a dot was marked. The count on the microphotos was compared with the original specimen, which was put under the microscope for continuous control measures. The count was as follows:

First dog: Non-exercised muscle — 58,017 fibers, exercised muscle — 61,561 fibers.

Second dog: Non-exercised muscle — 66,782 fibers, exercised muscle — 69,941 fibers.

The differences (about 5-6%) are within the normal variations and even if it appears that the exercised muscles have more fibers, it is not a significant difference. The skeletal muscle therefore hypertrophies by doing excessive work and does it by simple enlargement of its cells. It differentiates itself in its reaction to a greater demand from a series of other organs such as liver, kidney tissues, bone marrow, the vascular system which under the same conditions are able to create new cells.

Despite such limitation of the creation of new cells, the enlargement process of the muscle may be considered one of genuine growth phenomena, as Roessle has especially emphasized. The cell creation within any organ may be an important sign of growth, but does not necessarily have to be an obligatory one. That holds especially true for the muscle tissue. Also, beginning from certain months of the embryo stage to the conclusion of the extrauterine body development, a time period which certainly represents a growth period, the muscle mass grows by enlargement only, not by multiplication of cells.

The Journal is indebted to Charles Ross of Cleveland, Ohio for making the original text available.

EDITOR'S NOTE: Morpurgo's experiments were reported in *Virchow's Archives* in 1897. Since then, certain questions have been raised about his results. The student should refer to Adams, Raymond D., D. Denny-Brown and Carl M. Pearson, *Diseases of Muscle*. New York: Paul B. Hoeber, Inc., 1954, pp 208-210, and to Holmes, Richard and Philip J. Rasch, Effect of Exercise on Number of Myofibrils per Fiber in Sartorius of the Rat, *American Journal of Physiology*, 195:50-52, October, 1958.

AMBULATION WITH PYLONS AND THE 'FAULTY' GAIT

MANFRED R. M. BLASHY, M.D.*
JOHN TANZINE, C.C.T.**
JOSEPH OLDHAM, C.O.***

Pylon a Necessity for the Older Amputee

In the proper management of lower extremity amputees, particularly in the older age group, the use of temporary or "intermediate" prosthetic devices —so-called pylons—is necessary in order to achieve optimum results. Amputees past 50 usually have a multiplicity of disabilities which makes it undesirable in most cases to provide a standard prosthesis right away, at least until the patient has undergone a period of training. The patient has to prove himself and to convince the physiatrist or the therapist "by doing" whether or not he is capable to handle a prosthesis effectively and to ambulate without harming himself. To omit or cut short such training is medically unsound, economically wasteful, socially and vocationally unwise and may, at times, endanger the very life of the amputee. This has been emphasized in a previous paper by one of us (M.R.M.B.) along with the many advantages pylon training affords (1).

Some of these advantages, I should like to recall here.

Pylon training offers:

1. Best and quickest method of stump shrinkage.
2. Development or restoration of balance and stability.
3. Simple, cheap and quick production of pylon, presently in 24 hours at about one fourth or less cost than a standard limb.
4. Easy transition from pylon to final prosthesis, usually within 24 to 48 hours.

The "Faulty Gait"

The last-mentioned advantage is commonly not clearly recognized.

Many physiatrists feel that pylon ambulation causes a "faulty" gait pattern. Our standard texts (2, 3, 4, 5,) contain nothing on this subject. Just a little over a year ago, we learned at one of our outstanding training centers (6) the pylon training should be avoided "because of the 'faulty' gait it produces and the waste of time and effort involved in its correction." The strongest voice against pylons seems to have been raised in Klopsteg's text (7) where Alldridge and Murphy state ". . . no pylon or temporary prosthesis with stiff knee . . . is needed *when early fitting of a properly jointed limb is feasible.*" The authors go on to say that non-jointed devices "should be prohibited (8) . . . because . . . *the patient learns to walk with a stiff-knee gait and thus will later have greater difficulties in learning to use a conventional limb properly.*" *(Italics ours).*

We take exception to both of the statements quoted above. As to the first, the question seems to be appropriate: what is meant by "early fitting?" It always takes at least a month from measuring for an artificial limb to its final delivery. This period is further prolonged by the fact that measurements should only be taken when a fair amount of stump shrinkage has already been achieved in order to avoid too many changes of the socket later. This indeed used to be one of the most frustrating phases of the amputee program before pylon training became standard procedure; and it would be more so today in the era of the quadrilateral socket of the A/K amputee.

On the other hand, experience has also taught us that the best stump shrinkage occurs after the amputee bears weight in a well-fitting socket. In this dilemma, the only logical answer is the pylon. Together with the other advantages, it provides for a true early fitting of a walking device. One might add that the amputee gets rid of wheel chair or crutches, avoids the danger of joint contractures and, above all, he can walk! He can return home after being measured for his final limb. He can go back to work while his prosthesis is being made. The five, six or eight changes within the final limb because of pressure points, pain, or abrasions have been done away with. Thus, the humble "peg leg" has shown its blessings, and especially for the amputee past 50. From all of this, it also follows that the earliest fitting can best be accomplished with a pylon and that the term "early fitting" seems to become highly relative, if not purely academic.

The other exception we wish to take is to "the greater difficulties in learning to use a conventional limb properly" supposedly caused by walking with a stiff or locked knee when using a pylon. With our collective experience of about 40 years' work with amputees, we have never encountered "greater difficul-

*Chief, Physical Medicine and Rehabilitation Service, Veterans Administration Center, Temple, Texas.
**Chief, Corrective Therapy, Veterans Administration Hospital, Dublin, Ga.
***Orthopedic Shop Supervisor, Veterans Administration Center, Temple, Texas.

ties" based on a stiff knee. We have of course seen the stiff-knee gait and also hip-hiking or a circumduction gait, but it has rarely taken more than a few days or a week to overcome it. We have, however, experienced great difficulties, predominantly in the elderly amputee, because of lack of balance, coordination, instability, non-comprehension, fear and, last but not least, lack of motivation; that is to say: because of trouble in the central functions of the CNS rather than the peripheral. In such instances, it is true that the transition from pylon to prosthesis can and does cause delays, often to a marked degree, and indeed does prove that the patient will not be able to handle a "properly jointed" prosthesis at all. He will remain a pylon walker for the rest of his life probably on a limited scale or of course, he might have to give up the idea of walking altogether.

In sum, it appears that the problem of the stiff-knee gait has, at least in our opinion, been greatly overrated compared to other real difficulties. Unfortunately it still is stressed as recent experience indicates (6). It should be realized, moreover, that it is a purely mechanical difficulty and can be overcome by simple technical means. One of them is the "pseudopylon," an intermediate device constructed from a discarded artificial limb which has of course movable joints to begin with. Apart from this, the problem can be confined to the true stick pylon and reduced to three basic factors:

1. Modification of the distal part, the pylon stick.
2. Timing of the unlocking of the knee joint during training.
3. Unlocking of the knee joint.

Modification of the Pylon Stick

Among these, the most important factor is the modification of the pylon stick. There is one fact essential for the understanding of this problem, namely that the pylon stick is too light. The normal lower extremity set in motion by the muscle action in the beginning of the stance phase has enough weight to deliver the momentum necessary to carry it through the swing phase of the step; the pylon hasn't because it is made of relatively light wood and lacks an ankle unit and a foot. Yet, either has to arrive at heel-strike in full extension in order to support the weight of the body and to lift the center of gravity through its arc during stance. In the A/K amputee, moreover, the pylon, unlike the normal knee, has to maintain extension actually beyond heel-strike and foot-flat until the body weight shifts away from it on toe-off because the pylon knee is a simple hinge joint, unguarded and unguided by muscular forces; it cannot afford the first knee flexion at foot-flat, or it would jackknife. (This is the reason for mechanical locking of the pylon knee during the initial phase of pylon ambulation in the first place.)

Therefore, the pylon needs, if anything, an even greater momentum during the swing phase than the normal leg. It has to swing a fraction beyond, to slightly overreach the heel-strike position of the normal knee and come down to heel-strike more from above, so to speak, than from behind while the center of gravity moves vertically above it and forward, the body weight keeping the pylon extended. In brief, while the normal knee is being already decelerated before heel-strike, the momentum of the pylon has to last a fraction into the stance phase. This will and does happen since no decelerating muscle force has to be overcome with a pylon provided of course that the pylon stick is heavy enough to produce the necessary momentum.

Hence, the addition of weight or weights to the pylon stick is the essential modification in order to accomplish successful pylon ambulation with the knee unlocked. Experience has shown that 5 lbs. are commonly enough for this purpose, *i.e.* an amount which approximates the weight of the distal part of the final prosthesis. It will be sufficient for both the delivering of the momentum and the teaching of the "feel" and skill the amputee needs for mastering the accentuated swing phase of his gait.

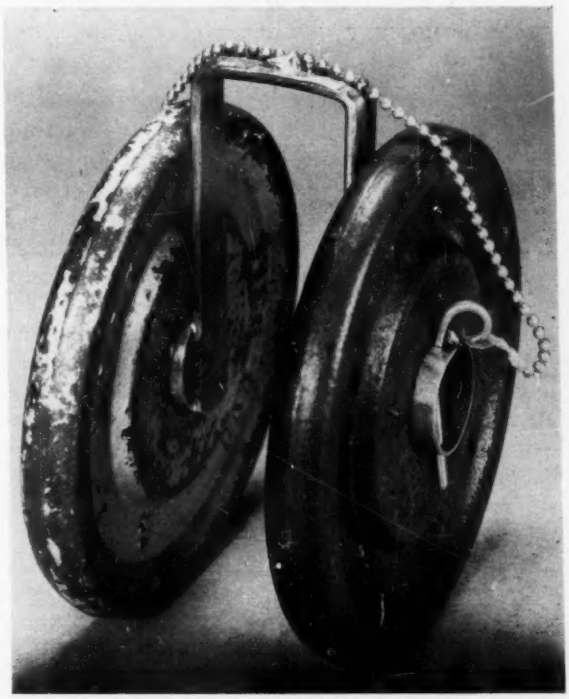


FIG. 1

FIG. 2

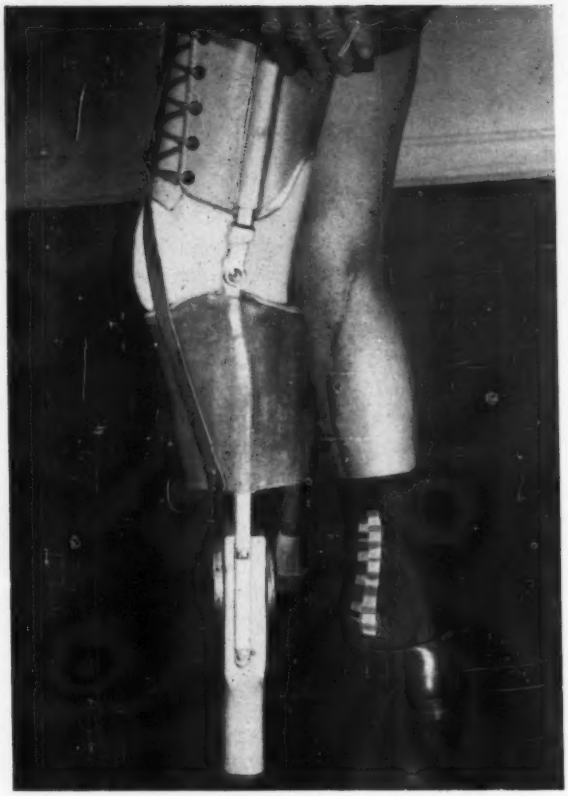


FIG. 3

Attaching the Weights

Once this is correctly understood, the technical fabrication of the weights and attaching them to the pylon stick is simple. One of us (J.T.) constructed a U-shaped steel bar fitting over the proximal rectangular end of the pylon stick (Fig. 1). A piece of pipe, ¾" long—it actually looks more like a broad metal ring—is welded to the outer side of each upright of the U-piece. Its diameter corresponds to the width of the holes of the standard bar bell weights. They are kept in place by pins which fit into two small holes at the end of the rings. The pins are attached to each other by a key chain. When the patient is ready, the U-piece is placed over the pylon stick, two weights, 2½ lbs. each, are pushed over the rings, one in front, the other in the back of the stick; the pins are pushed through the holes on either side—and the pylon is ready for use with the knee unlocked.

Another method is to fabricate the weights in lead (J.O.), molding them into very flat discs (Figs. 2, 3) and drilling small holes through their centers. Regular wood screws fit through these holes so that the weights can be screwed to either side of the pylon stick. To be sure, these are not the only methods for solving this problem; they have been found, though, to be sufficient for our purpose. Both make use of materials available in gymnasium, brace shop or workshops of any hospital. They are easy and cheap to fabricate, can be used practically indefinitely and are interchangable from one amputee to another. These are really only technicalities. The point is that the amputee is being enabled to use his pylon with the knee unlocked and early in his training.

This brings us to the second factor of timing. From the arguments about pylon training, we have gained the impression that the negative attitude is predominantly based on the misconception that the unlocking of the knee joint cannot be done before the patient has received his final prothesis. Fortunately, this is not true. It must indeed be emphasized that even without the "Added-weight Technique" a patient can learn to walk on a pylon with an unlocked knee, especially the B/K amputee who can relatively easily compensate for the lack of momentum by an extra motion, a forward "snap" of the pylon just before heel-strike. Even the A/K amputee can do so with a similar forward rotation of the hip. Admittedly,

Cont'd on P. 173

THE EFFECT OF LOW-RESISTANCE, HIGH-REPETITION PROGRESSIVE RESISTANCE EXERCISE UPON SELECTED MEASURES OF STRENGTH AND FLEXIBILITY

RALPH L. WICKSTROM, Ph.D., C.C.T.*

Introduction

In studying progressive resistance exercise the major emphasis seems to be directed toward finding the most efficient procedures for developing maximum contractile strength in muscle tissue. Because of the pressing demands for this knowledge some other aspects of p.r.e. have been relegated to a status of relative unimportance. Since DeLorme (1) stated that low-resistance, high-repetition exercise produces endurance and is incapable of producing strength and power, there has been little interest in that system of exercise. It seems worthwhile to explore some of its possibilities.

The low-resistance, high repetition system in its pure form requires an increase in the number of repetitions a movement is done without any increment in external resistance. Ordinarily this interpretation would exclude the use of progressive resistance simply by definition and refer to exercises in which weights are not used for resistance. However, since there is no official terminology or delimitation of terms in p.r.e., one is supplied the luxury of latitude in individual interpretation. Tacitly, some investigators agree that when an exercise can be done at least 15 times the low-resistance, high repetition system of p.r.e. is being used. That view is held by this writer.

It was the purpose of this study to determine the effects of a modified low-resistance, high-repetition system of progressive resistance exercise upon selected measures of strength and flexibility of adult males.

Method of Procedure

Sixty-four college men were used as subjects in this study. They participated in a weight training program twice a week (Tuesdays and Thursdays) for a twelve week period. Selected strength and flexibility measurements were taken prior to the program and immediately following it. Back extension strength, truck flexion strength, and arm flexion strength were measured using the cable tensiometer test described by Clarke (2). The Leighton Flexometer (3) was employed in measuring arm flexibility (flexion-extension range) and trunk flexibility (flexion-extension range). All strength and flexibility testing was done by the writer.

A modified low-resistance, high-repetition system of weight training was utilized. Each exercise was done using a weight that could be handled 15-20 times with maximum effort. When the twenty repetition level was reached sufficient weight was added to reduce the number of repetitions with full effort to fifteen. The exercise program consisted of seven exercises calculated to bring into action all the major areas of the body. At least one exercise emphasized each of the following areas: front of arms, back of arms, chest, upper back, lower back, abdomen, and legs. Only one set of each exercise was done per work-out.

The following are two different sets of exercises used during the twelve week period:

Set A

1. Zottman
2. Inclined sit-up with weight
3. High pull-up
4. Back extension with weight
5. Straight arm pull-over
6. Squat jump with weight
7. Bent-over lateral raise

Set B

1. Alternate press
2. Ordinary dead lift
3. Alternate curl
4. Sit-up with weight (heels close under hips)
5. Chest raiser
6. Supine press
7. Squat walk with weight

A warm-up consisting primarily of free hand calisthenics preceded each resistance exercise period.

Two weeks prior to the initial testing and the twelve week experimental period the subjects engaged in preliminary weight training using the same exercises and the same exercise system as were used later. This was an adjustment period which served as an orientation to p.r.e. It might be pertinent to indicate the difficulty some of the subjects had in adjusting to the exercise system used. Many became nauseated during several successive workouts during the outset due

*University of Wichita (Kans.)

TABLE I

Significance of Mean Performance on Measures of Strength and Flexibility Before and After the Progressive Resistance Exercise Program

	N	Before ex.	After ex.	Diff.	F	t	Increase %
Trunk flexibility	64	186.5°	193.5°	6.9°	1.17	5.72*	3.7
Arm flexibility	64	215.8°	213.3°	—2.5°	1.09	1.78	—1.2
Arm flexion strength	62	109.8°	135.2°	26.4°	1.04	11.61*	24.0
Trunk extension strength	62	101.4°	126.5°	25.1°	1.37	7.46*	24.7
Trunk flexion strength	62	101.4°	110.6°	9.2°	1.38	3.75*	9.1

*Significant at the 1 per cent level of confidence.

TABLE II

Mean Changes in Flexibility for Upper and Lower Halves of the Group

	Lower Half of Group				Upper Half of Group			
	Before ex.	After ex.	Diff.	Increase %	Before ex.	After ex.	Diff.	Decrease %
Trunk flexibility	169.2°	183.3°	14.1	8.33	203.8°	203.3°	—.5	.27
Arm flexibility	205.0°	205.6°	.6	.29	224.0°	214.4°	—9.6	4.29

to the demands made by the high repetitions. However, it was felt that this experience did not deter them from exerting maximum effort during subsequent work-outs.

Results

There was a statistically significant increase in strength in each of the areas tested. Arm flexion strength increased 24 per cent, trunk extension strength increased 24.7 per cent, and trunk flexion strength increased 9.1 per cent (Table 1). A disquieting note was that five of the subjects showed a loss in strength in all three of the areas tested. An examination of their records revealed consistent increases in performance in each of the exercises as might be expected. Many variables could be examined for the explanation of this finding. Diurnal variations in strength, individual response to tensiometer strength testing and individual response to low-resistance, high repetition p.r.e. are among the possible key areas in which to seek a solution. This phenomenon definitely requires more study because of its implications for rehabilitation and further research in p.r.e. We associate an assurance of improvement in strength with p.r.e. and must seek clarification of any factor that vitiates that assurance.

Trunk flexibility was increased an average of 6.9 degrees and this was significant at the 1 per cent level of confidence. A mean decrease of 2.5 degrees in flexibility was not statistically significant. Unfortunately, a statistical analysis of group flexibility does not describe the individual variability in response to the exercise system used in this study Of the 62 subjects, 16 became less flexible in trunk flexibility and 30 became less flexible in arm flexibility with some extreme changes being recorded.

In order to understand further the effect of p.r.e. upon flexibility the group was divided into upper and lower halves based upon the first flexibility tests (Table 2). The lower half of the group increased 8.33 per cent in trunk flexibility while the upper half decreased .27 per cent. On the arm flexibility test the lower half increased .29 per cent, but the upper half of the group decreased 4.29 per cent. In trunk flexion 3 of the lower group and 13 of the upper group became less flexible and in arm flexion 9 of the lower group and 21 of the upper group became less flexible. The exercise program used in this study seemed to have less effect upon those who were less flexible at the beginning than those who were more flexible.

Attitude Toward High Repetition p.r.e.

The low-resistance, high-repetition system of p.r.e. does not particularly appeal to healthy young

Cont'd on P. 173

SOME PERSONALITY ATTRIBUTES OF CHAMPION AMATEUR WRESTLERS*

PHILIP J. RASCH, Ph.D., FACSM

M. BRIGGS HUNT, Ed.B.

During the time that one of the authors (P.J.R.) was employed as a corrective therapist in a Veterans Administration neuropsychiatric hospital, the head of the medical service instructed the corrective therapists to encourage their patients with homosexual tendencies to participate in wrestling, on the theory that it would give them a socially acceptable means of physically contacting other males. To the question of whether this implied that normal wrestlers might be participating in this sport in response to similar, albeit subconscious, urges, he answered that physical educators and coaches voluntarily select occupations in which they will spend their lives associating principally with members of their own sex. Probably this reflects a sublimation of latent homosexual impulses in a socially acceptable and very useful way, just as the surgeon may sublimate sadistic tendencies in a manner very beneficial to and highly approved by society.

There can be little question but that most individuals' choice of a profession largely reflects their underlying drives or psychological states. Menninger (1) has suggested that the obstetrician may be gratifying his infantile wish to become a mother, the psychiatrist may be compensating for feelings of rejection, the urologist shows a connection with the phallic period of development, and proctologists with the anal period. However, psychological studies of wrestlers to date have largely centered around the measurement of aggression. Johnson, Hutton, and Johnson (2) studied a group of champion athletes, including two wrestlers, and concluded that the group was characterized by extreme aggression, uncontrolled affect, high and generalized anxiety, high level of intellectual aspiration, and exceptional feelings of self-assurance. In a later study (3) it was observed that heightened anxiety, increased neurotic tendencies, including compulsiveness and markedly heightened body consciousness, aggressive feelings, and "general" constriction of personality" were common findings among wrestlers prior to competitive matches. Three wrestlers of exceptional ability were found to be extremely aggressive, displayed exceptional "drive" to be successful, and had strong feelings of self-assurance. These traits, it seems safe to say, are ones which in our culture would be thought of as characteristically masculine. The results of a series of projective tests led Husman (4) to conclude that wrestlers had greater over-all intensity of aggression and were more extra-punitive and less intra-punitive than were boxers.

Starting with the basic assumption that much of what a person does "is influenced by his perception of how other persons of his sex behave and by what he considers appropriate behavior for persons of his sex," Berdie (5) developed a psychological masculinity-femininity scale consisting of a list of 148 adjectives descriptive of personality, and reported that it "substantially" discriminated between male college freshmen and homosexual men and was reliable enough for group research. Comparative scores for his subjects are shown in Table I.

If wrestlers are acting in response to strong latent homosexual urges, it could be postulated that their scores would resemble those of known male homosexuals more closely than they would those of male college freshmen in general, whereas the studies reported above would lead one to anticipate that their scores would be lower *i.e.* more masculine, than those of the freshmen. To test this hypothesis, the Berdie test was administered to 14 candidates for the United States 1960 Olympic team during the time they were in the training camp at the University of Oklahoma. The list was labeled simply "A Personality Adjective Check List," and the subjects were given no information regarding the particular characteristics under study.

The possible range of scores in the Berdie test is 61 points, from 46, the most feminine score, to minus 15, the most masculine score. The actual range of scores of the 14 wrestlers was 12 to -3, with a mean of 7.2 and a standard deviation of 4.5. It may be concluded, therefore, that wrestlers of Olympic Games caliber do not differ appreciably from the male freshmen upon whom this test was originally standardized in so far as their masculinity-feminity rating is concerned, and do not, therefore, show scores similar to those recorded for avowed homosexual males.

The test responses were then examined to determine whether they shed light on how the wrestlers as a group saw themselves. Twenty-eight of the adjectives were not checked by any of the subjects:

*Report 60-20: H: Los Angeles County Osteopathic Hospital and the Department of Physical Education, University of California at Los Angeles.

		N	M	S.D.
1955	Male Freshmen in the College of Science, Literature, and Arts, University of Minnesota	100	7.9	5.5
1957	Male Freshmen in the College of Science, Literature, and Arts, University of Minnesota	100	9.1	5.4
1956	Female Freshmen in the College of Science, Literature, and Arts, University of Minnesota	200	16.7	6.5
1957	Female Freshmen in the College of Science, Literature, and Arts, University of Minnesota	193	15.6	6.1
1957	Homosexual Men	43	18.9	5.8

SELECTED MEANS AND STANDARD DEVIATIONS OF FEMININITY SCORE FOR BERDIE'S SUBJECTS
TABLE I

autocratic, boisterous, complicated, cruel, distrustful, effeminant, feminine, graceful, gracious, greedy, hostile, insightful, intolerant, obnoxious, outgoing, painstaking, resentful, rough, selfish, shallow, spontaneous, thorough, thoughtless, timid, unaffected, unambitious, unkind, or weak. Siegel's (6) Table D for determining the significance of one-tailed probabilities associated with various observed values in the binomial test indicates that when dealing with an N of 14, a frequency of 12 may be accepted as significant at the 1% level of probability. Of the 148 adjectives listed in the test, only three were checked by twelve or more subjects: active, athletic, independent. In view of the results of previous tests, it was surprising to find that the number of wrestlers checking such descriptive terms as "aggressive" and "anxious" fell far below statistical significance. Perhaps this is related to their failure to check "insightful" as descriptive of their characteristics.

When the answers to the entire test are reviewed without regard to the statistical significance thereof, a rather clear picture emerges. It is evident that in their own eyes the majority of these athletes consider themselves straightforward, mature, modest, and masculine, determined to accomplish their goals and confident of their strength to do so. This is, of course, what we might expect to find in individuals who have repeatedly demonstrated their ability to master in personal combat the great majority of their countrymen of similar weight.

REFERENCES

1. Menninger, Karl, Psychological Factors in the Choice of Medicine as a Profession. *Bulletin of the Menninger Clinic*, 21:51-58, March, 1957, and 21:99-106, May, 1957.
2. Johnson, Warren, R., Daniel C. Hutton, and Granville B. Johnson, Jr., Personality Traits of Some Champion Athletes as Measured by Two Projective Tests: Rorschach and H-T-P. *Research Quarterly*, 25:484-485, December, 1954.
3. Johnson, Warren R. and Daniel C. Hutton, Effects of a Combative Sport Upon Personality Dynamics as Measured by a Projective Test. *Research Quarterly*, 26:49-53, March, 1955.
4. Husman, Burris F., Aggression in Boxers and Wrestlers as Measured by Projective Techniques. *Research Quarterly*, 26:421-425, December, 1955.
5. Berdie, Ralph F., A Femininity Adjective Check List. *Journal of Applied Psychology*, 43:327-333, October, 1959.
6. Siegel, Sidney, *Nonparametric Statistics for the Behavorial Sciences*. New York: McGraw-Hill Book Company, Inc., 1956, p. 250.

ELECTRONIC FLASH AIDS PAINLESS PHOTOGRAPHY OF INNER EYE

An electronic flash system that provides light for photographing the interior of the human eyeball—and quickly enough to give a minimum of discomfort to the patient—has been developed by a Veterans Administration medical illustrator. He is Leonard M. Hart of the Durham, N.C., VA hospital's medical illustration division. Hart's lighting system can be used on a standard retinal camera.

Hart has been developing the electronic flash for about five years. He devised the lighting system while he was employed at the VA's West Side Hospital in Chicago and perfected it at the Durham VA hospital, where he is working in conjunction with Dr. Albert Heyman of Duke Hospital.

Although photographs of the inside of the eyeball had been possible previously, the process involved use of a carbon arc light directed into the eye both for focusing and for taking the picture. As this was uncomfortable for patients, many of them discontinued treatment before the process was finished.

The electronic flash is used for only one-thousandth of a second, and focusing is done by use of a milder repetitive flashing light. This method gives a much better picture. Dr. Heyman uses the photographs to study blood vessels inside the eyeball, as an aid to diagnosis of abnormalities in blood vessels of the brain and for research about strokes. The blood vessels of the retina, or back of the eye, often yield clues as to the condition of certain blood vessels inside the brain.

Hart now has begun working on a system for taking fluorescent motion pictures of the inside of the eye. This would be a new feat in photography and a considerable aid to doctors in diagnosis and treatment. Some treatments using pictures of the interior of the eye require photographs taken at seven seconds or less apart. Obtaining such rapid exposures with present equipment is difficult.

Hart described his new electronic flash system at a recent meeting of the Biological Photographic Association, in Salt Lake City. The VA has awarded him $300 and a certificate of appreciation for his work in developing the system, which is being adopted by the agency for use at its other hospitals.

WORK THERAPY FOR THE HANDICAPPED*

JULIAN VOGEL, C.C.T.**

The purpose of this paper is to present the aspects of a work therapy assignment in corrective therapy as a means toward rehabilitating the physically and mentally handicapped.

Early in 1958 the corrective therapy section of the Veterans Administration Hospital, Waco, Texas, instituted the old "buddy system" that many of us remember from our service experiences. In this endeavor, patients were selected to function as patient assistants in corrective therapy to help others to help themselves. We definitely feel that this type of program can be proven successful as has been demonstrated by the noticeable improvement of our patients' search for material security, their feelings of personal responsibility, their desire for group approval, and their pride in skill.

A good corrective therapy program is valuable in all types of hospitals, but from the author's standpoint, it is particularly so in the psychiatric hospital where patients are ambulatory, but tend to lead a more or less sedentary life. In such a program pent-up energy can be directed into constructive rather than destructive channels, excessive energy can be utilized to the patient's advantage, maintenance of good patient morale can be afforded through alleviation of boredom, and the strengthening of motivation can accelerate recovery. As a result, the patient becomes better adjusted to the hospital, becomes more amenable to treatment, and hastens his return to his home or community.

When we applied this "buddy system" approach in our corrective therapy program, the patients we selected to function as patient assistants were chosen on the basis of their performance in the clinic (or gymnasium) by: (1) demonstrating outstanding abilities in athletics, (2) showing a desire to improve their physical well-being, or (3) revealing that they had special interest in helping their fellow patients. There were also a few patients who had requested to remain in corrective therapy all day. In arranging with their respective physicans for the patients to be assigned to us as patient assistants, we also gained an opportunity to demonstrate to the doctors the value of our new program. When the duties and responsibilities of the patient assignment became crystallized, the supervisor of the industrial therapy program collaborated with us in drawing up the formal description of the job which is titled Patient Assistant in Corrective Therapy (Table 1).

This work therapy activity leads to a better hospital adjustment by the patient as well as to a better adjustment outside the hospital. Furthermore, it contributes directly or indirectly to the patient's physical or mental improvement, and to the development of additional work and social skills. The work assignment is determined solely by the benefits to be derived by the patient from the assignment. The term "work" involves the exercise of physical and mental energy for the accomplishment of some predetermined objective, and in work therapy the predetermined objective is inherent to the hospital operation. "Therapy" is defined as the treatment of disease through the use of medical and/or psychiatric procedures to effect optimum recovery in the patient treated. In order to enable the patient-assistant to carry on his assignment effectively, and to receive maximum benefit from the prescribed assignment, he must be appraised, counselled, and instructed regularly. It is the duty of the therapist to inform the physician at once of inappropriate actions or undesirable attitudes exhibited toward other patients by the patient-assistant, in order that he may be reassigned.

The patient-assistant's training consists of instructing him in the primary objectives of corrective therapy for neuropsychiatric patients which are: (1) to amplify the exercise program to stimulate the other patients' interest into concrete pleasurable activity; (2) to motivate patients into socially constructive interaction rather than to isolate themselves; (3) to develop aspects of their own personalities by making active participation attractive; and (4) to stimulate latent interest in athletics, and thereby giving patients opportunity to practice one kind of social competition in which there are tangible rewards for everyone. The patient-assistant should know exactly what exercises to give, and why he is giving them. Failure to impress these facts upon the patient-assistant may seriously jeopardize the program, and defeat the purpose. The following activities are taught, demonstrated, and when possible, literature about them is provided: (1) Calisthenics; (2) Gymnastics; (3) Aquatics; (4) Adapted sports, and (5) Miscellaneous outdoor activities.

The attitudes of the patient-therapist are extremely important, and the establishment of morale-building, satisfactory inter-personal relationships depends on the persons who plan and direct the assign-

*Presented at APMR Clinical Session, Tri-Organizational Conference, Santa Monica, Calif., June 15, 1960.

**Chief Corrective Therapy, Veterans Administration Hospital, Waco Texas.

1. *Type of Patient* for whom the assignment may be prescribed: Any privilege patient in fair to good contact, able to follow simple instructions, and to do fairly arduous work. Patients with orthopedic disabilities are acceptable. Two patients are assigned in each of our seven clinics.

2. *Description of Work*: The duties involved in this job may vary according to the individual's needs and abilities. The duties include: assisting the corrective therapist or corrective therapy assistant in giving calisthenics; participating in games, such as badminton, basketball, etc.; inspecting treatment areas for hazards and reporting them; running errands to various departments or buildings; storing equipment and making minor repairs on it; cleaning and conditioning leather balls, bags, etc.; sorting and stocking clean gym trunks, linen, and preparing soiled ones for the laundry; dusting, sweeping, mopping, etc.

3. *Hours:* 8:00 to 11:00 A.M. and 1:00 to 4:00 P.M., Monday through Friday. Hours will vary according to the patient's needs and ward routine; however, each patient should have a definite schedule to follow. The physician, therapist, and patient regulate the number of hours each patient works.

4. *Environment*: Inside: C. T. Clinic, fairly noisy, hot in summer. Outside: In good weather, works in play areas, runs errands between buildings. Ample opportunity is given for rest periods, since this work requires considerable physical exertion.

5. *Tools, Materials, and Equipment*: *Tools*: Crescent wrench, screwdriver, pliers, and inflating pump. *Materials*: Saddle soap, mat cleaner, lubricating oil and grease. *Equipment*: Gym apparatus, such as weights, stationary bicycles, and rowing machines. Athletic gear such as body bags, balls and gloves.

6. *Precautions*: Each new patient is given an orientation by the Chief, Corrective Therapy. Initially, the patient is given close supervision by the corrective therapist, or C. T. assistant, to whom he is assigned. When the patient becomes more familiar with the work, the amount of supervision may be decreased according to the ability of the patient. If adaptable, the patient will be rotated through our seven clinics.

7. *Attitude of Patient Supervisor:* The C. T. staff members maintain a general attitude of permissiveness. They accept the patient generally as one of them, and are willing to help him in any way they can.

8. *Opportunities for Pre-vocational Training*: The primary goal of this activity is treatment; however, a patient who adjusts well in this assignment may be recommended for member-employment. The avocational possibilities strongly exist and can be developed further.

TABLE I

JOB DESCRIPTION FOR PATIENT ASSISTANT IN C.T.

ments. The therapist must have: (1) an ability to effectively orient patients to the program; (2) a good understanding of human growth and development; (3) an understanding of the effects of disease and injury on structure, functions, behavior, and personality; (4) an ability to establish and maintain a satisfactory relationship in order to help the patient gain an understanding of his problems and potentialities; and (5) an ability to use training sessions constructively for maximum benefit of patients through appropriate counselling.

In assigning a patient to corrective therapy to work as a patient-assistant, the prescribing physician may have any or all of the following objectives in mind for his patient: (1) developing self-respect and a sense of responsibility; (2) learning to work with others; (3) developing good work habits; (4) developing a working tolerance; (5) constructive use of excess energy; (6) improving muscle tone, circulation, and coordination; and (7) preventing psychological deterioration.

In the short time that this program has been in effect, eighteen patients have been assigned, with many desirable results obtained. One example of this effectiveness can be illustrated by the following case history:

Jimmie, 29 years of age, was admitted to our hospital in 1955. He had a history of psychotic behavior and in 1951 was diagnosed as schizophrenic. He was medically discharged from the service. His symptomatology included hallucinations, symptoms of withdrawal, and inability to get along with other people. He claimed that other people picked on him. He had been involved in over eighty fights, and he could not relax, but even before 1951, it was noted that he showed an inclination to isolate himself. Before hospitalization, the patient bought a punching bag and used to work out hours at a time with it. He expressed considerable fear that others considered him homosexual. His mother used to dress him as a girl when he was a child. He hated her for that, and showed hostility toward her. His father's over-interest in business prevented him from spending time with the patient.

During his first two months at the hospital, ten E. C. T.'s were administered. They were followed by psychotherapeutic interviews during which he leaned increasingly on the therapist, substituting him for the unloving parents. Under counseling, he was able eventually to display considerable improvement in his ability to recognize, contemplate and verbalize conflicts and feelings. To be able to reach a stage of taking the responsibility of his own problems, the patient had to develop an ego image of a fairly competent individual with belief in his own powers of volitional control. To aid in this process, a great amount of support was extended the patient by continuing him in group psychotherapy sessions, and at the same time assigning him to corrective therapy as a patient-assistant.

In corrective therapy, the patient was given an opportunity to exercise and box for various periods, extending from one hour to one day. While the psychotherapist attempted to direct the patient's fighting urge toward courage in facing his problems and developing inter-personal tolerance and away from immature behavior, the corrective therapist was able to help the patient to build up a more favorable self image and reduce untoward muscular tension. At the same time, the psychotherapist was working toward remolding the patient's ego ideals on a more realistic level in order to lessen tension and reduce the discrepancy between the patient's self image and the ideal image. In particular this process involved a change from reactively impossible masculine striving to a qualtitatively different role of masculinity, such as a tolerance for belief in the self and others, and courage to face his own problems. His identification with therapists and some restructuralizing of ideals provided psychological growth in this area.

The psychotherapist stated that the patient's change in behavior was even more striking in his group psychotherapy sessions. During his stay in the group, the patient matured from a tremulous spectator into an assertive member who guided group discussions into psychologically relevant areas. The patient is presently on an extended trial visit, and seems to be making a satisfactory adjustment at home.

In the psychiatrist's opinion, this type of patient may achieve tension-reduction without psychological threat through corrective therapy participation, and may not require heavy doses of tranquilizers. In recent months, the author has noted untoward reactions of anxiety and panic in three patients, with strong narcissistic trends, paranoid fears, and reactive masculine striving which might have been precipitated by a psychological reaction to heavy medication. These men devote considerable attention to their body tonus, and, seemingly react to the initial relaxation and tonus change which follows tranquilization with extreme fear of being rendered ineffectual and thus overwhelmed by others.

Since the goal of this activity is therapy, primary consideration is given to each patient's individual needs. The arduous physical activity provided by the assignment helps the patient-assistant to develop himself physically as well as mentally, and at the same time allows him to work off excess energy and hostility. Many of our patient-assistants want to help other people, and this provides them a good means of self-expression and self-satisfaction, not from the standpoint of receiving a pay check for their contribution, but by meeting their psychological needs. It also provides opportunity for social interaction which contributes to their skills in developing good relationships with others. In addition, the patient-assistant has an opportunity to motivate other patients who may not respond to personnel. With the assistance of these men, corrective therapy can treat additional patients. Furthermore, it is possible for patients to receive more individual attention in the clinics where patient-assistants are assigned.

We have long recognized that regular, satisfactory employment or performance of some pleasurable duty has therapeutic value for most of us. Whoever coined the phrase: "Idleness is the devil's work shop" must have been aware of the certain perils of inactivity of long duration. Certainly, all of us have seen marked deterioration appear in persons who have become idle, or have shown progressive loss in capacity to function, whether in work or in play. Furthermore, there is ample evidence to support our belief that the healing process is augmented by prescribed activity, graded to meet the physical and emotional needs of the patient.

The ultimate goal of rehabilitation is to return our patients to the community as productive wage earners. This goal becomes much more real to the hospitalized patient when he realizes that he can work acceptably again. The vocational significance of work is thus of very great importance to him. Our patient-assistants are provided opportunities to develop good work habits, such as punctuality in reporting for work, following instructions and accepting criticisms. Work tolerance is an important requirement in work, and this may be developed also.

Tremendous strides have been made in the past few years in the treatment of our V. A. patients, particularly the neuropsychiatric group. As a consequence, the need for additional corrective therapists has been more pronounced. Certainly, no one can be substituted for a qualified corrective therapist, but we must admit that a proficient corrective therapist is also a progressive corrective therapist. The patient-assistants at our station have helped us in meeting the increasing demands for our services, and in the process, they have gained much in terms of restored self-confidence and motivation toward leaving the hospital.

The writer is indebted to Lewis W. Leskin, M.D., staff psychiatrist, and Walter E. O'Connell, Ph.D., clinical psychologist, of VA Hospital, Waco, Texas for their help in preparing this paper.

Chapter Activities

Eastern New York Chapter

The Eastern New York (formerly Eastern States) Chapter held its Fall meeting at the Roosevelt Hotel, New York on October 7. A new slate of officers was elected: Leo Berner, President; Mario Andriola, Vice President and Murray Appel, Secretary-Treasurer.

Guest speaker at the meeting was Julian Vogel, Chief, Corrective Therapy, V.A.H., Waco, Texas and 3rd Vice President of the national association. Mr. Vogel presented a report on the 1960 convention held in Santa Monica, Calif.

An expression of thanks and gratitude was accorded the outgoing president, John Baldino and his staff.

Mid-Atlantic Chapter

The Fall conference of the chapter was held at the Headquarters of the American Psychological Association in Washington on Sept. 9 and 10. Joseph H. Van Schoick, Chief, Corrective Therapy, Central Office arranged the program which featured talks by Clifford Bream, Chief of Recreation, and George Frye, Chief, O.T., both of Central Office. On the 10th, conferees participated in a panel and group discussion of "Present Day Application of Corrective Therapy for the Golden Age Group.'

RECREATION SERVICE FOR THE AGING

JAY S. SHIVERS, Ph.D.*

Introduction

Provision for recreational services to the aging is based upon five distinct premises:

1. Public recreational agencies have a mandatory obligation to serve the entire public body.
2. Perhaps no other age group has the need for recreational opportunity and service as the individual approaching the oftimes unnecessary retirement age.
3. Older adults contribute and have contributed tax money for the support of public recreational agencies and they should receive service on that basis.
4. The older or retired adult has earned the right to enjoy life in those years remaining to him after a life of fruitful employment. It is unfair for any community to neglect or ignore those citizens who have been gainfully employed, but who must now relinquish their economic independence to younger persons for various reasons and make their retirement years a perplexity of insecurity and doubt.
5. Every community may utilize the skills which individuals have built up over their vocational lives to enable the community to better serve the needs of its citizens. Older adults, if they are so inclined, may provide valuable technical skill and talent by being a part of the service which the public recreational agency presents.

In this society, many problems of a personal as well as extra-personal nature face the older adult. These may be classified under several headings: physiological, economic, social and health needs.

Physiological Problems

With age there is a continuous deterioration of physiological structure within any living organism. The human being is no exception. This process may be rapid or slow depending upon many biological, environmental, and personal habit factors. The genetic inheritance of the individual will undoubtedly play an important part in this process. Environmental pressures putting continual strain on the individual thereby producing an excessive amount of tension within the person, also contribute to decline. Surely few can doubt that personal excess, dissipation. and abnormal living will play some role in aiding this deterioration.

With age, there inevitably comes a loss of sensory acuity. This is part of the physiological cycle of life. In youth, the physically normal individual is blessed with sensory organs that are sharp and useful. Probably, that is why ice cream, hot dogs, or other foods never have that same acute delicious taste which we experienced in youth. Food seems to lose its appetizing nature to many older adults and the lessening of taste sensation may be one of the causes. The metabolic rate slows down and thus may be a further cause of declining food appeal. It is the body's way of indicating that it cannot use as much fuel as it once did to maintain the organism.

Some adults lose part or all of their hearing sense. There is a tendency toward diminished eyesight and tactile perception. In other words, the sensory organs of sight, taste, smell, touch, and hearing begin to lose strength with advancing age. There will be those atypical few who retain much of their sensory acuteness until death, but in general the sensory organs become impaired with age.

Inevitably, age leads to a slowing down of basic body functions. There is a stiffening of the joints, muscles lose their firmness and tone. Flexibility of movement is gone and in its place is the slow, tired methodical locomotions of age. The carriage of the body is noticeably bent, shoulders become bowed and the torso thickens through the middle. There is a corresponding loss of fascia or subcutaneous fat which provides body warmth. Older adults are more susceptible to change in temperature. Perhaps this is one of the reasons why aging persons, if they have the financial means, seek southern climates after retirement.

Deterioration is also noted in the vital organs. The thyroid gland decreases in size and decreases its secretion. There is a corresponding decrease in the size of renal tissue; the brain shrinks and becomes more folded; the thymus and liver tend to decrease with age. All of these changes occur normally and their onset is not a product of disease or trauma.

Psychological Problems

Changes in the physiology of the individual bring about significant psychological manifestations. These imperceptible physical changes throughout the life span may be the cause of personality change or dis-

*Mississippi Southern College, Hattiesburg.

turbance. Slow as they are, physiological changes are marked in terms of different periods of life. Thus, the change from sub-teen to adolescence is very noticeable as is the change from the middle adult years to old age. Such modification of basic somatic structure and tissue will have its effect upon the mental characteristics of the aging person.

Perhaps the most notable personality shifts will occur in the individual attitude toward certain subjects. The shock of job loss, vocational emptiness, loss of family responsibility or associates through death, independence, or mobility, the loss of routine and habit, which has been developed over a lifetime, often give rise to psychological conflict. Insecurity which results from job loss, isolation from former associates, loss of status in the home as well as in the community, which is a by-product of a mandatory retirement system, are the rewards which confronts the aging person. Reduced status occurs after vocational employment is denied. The individual in retirement is generally looked upon as a burden, a non-productive individual, and one who may be shunted aside or into the backwash of life. This basic change from productive employment, active routine of job, good citizen in the community, supporter of the home is rudely taken away from many aging persons when they reach 65 years of age. This appears to be the magic sign of senility to many in this society. Obviously, such a modification of life focus could result in dramatic changes in the personality and emotional stability of the person involved.

Who can really blame the older adult from feeling left out of things, put on the shelf, ignored, insecure, helpless in the face of personal and public apathy? His reactions to this dynamic cessation of his life's aim are varied and meaningful. Typical reactions has been to lie down and die. What is the use of living if no one cares? Why struggle for existence when loneliness is the objective? Self-pity, mental degeneration, physical deterioration and finally death seems to be the track upon which the older adult is placed by his benevolent society. Too often, this is the case. But this does not have to happen. If the individual has been prepared to assume the loss of employment, if he has been encouraged to save his money or to stretch his finances through annuities and other monetary interest bearing means, some of his problem will disappear. If the individual has family and friends from whom he can continue to gain support and companionship, this picture is far from true. The individual who allows himself to be lulled by the knowledge that growing old is something to be faced in the future must live with this problem. He suddenly wakes up to the fact that retirement is imminent, former associates are no longer around, and that the family has slowly drifted apart.

The shock of reality is sometimes too much for the older person to bear. Everything is gone. There is no room for the aged person. Things are moving too fast for him. He cannot learn new or radically different skills with which he might find a place. People are unsympathetic; they have problems of their own. No one wants to listen to the complaints and frustrations which the adult experiences. Life is bleak and hopeless. No wonder the older adult shows a shift in personality. No wonder his thoughts turn inward. He is a displaced person in society—unwanted, unloved, uncared for. Where are the golden years to which he looked forward? Why work a lifetime only to be cast aside like a worn out shoe? Where is his place? What can he do?

Economic Problems

Physiological and psychological problems are not the only worries. Inevitably the older adult has economic problems. Once his work life is finished he finds himself in financial difficulty. He is no longer considered an economic producer. His buying power is curtailed, and this leads to a decreased assumption of responsibility in the home and in his community. Committee appointments are not as frequent as when he was younger. No one solicits the help of one who is not in a financial position to support himself. Housing, medical payments, food, clothing, and his few amusements quickly eat away whatever savings he may have. Financial subsistance after retirement, is just that, subsistance. The bare existence on which the individual may be able to scratch out his living is meager to say the least. This adds to the worry, frustration, and insecurity which the older adult feels and necessarily contributes to mental deterioration and hastens his demise.

Social Problems

As if this weren't enough, the social implications of age are also demoralizing. Loss of routine and the associations which one finds on the job harries the retired person. He has few chances to socialize, to get out and meet others, to gain the companionship and stimulation which friends bring. Lack of funds and physiological inadequacy make it difficult for the oldster to move around. His mobility is greatly curtailed. He becomes dependent upon others, not only for his creature comforts but also for the simple joys and satisfactions that make life worth living. Socially, the older adult is less acceptible than any other age

group. He doesn't belong; he contributes nothing to any group—at least this is what many people believe. Instead of profitably utilizing the talents and skills which older people have spent a lifetime developing, this valuable resource is overlooked in the rush to serve youth. It may be more glamorous to work with the young, but the aged may also gain immeasurably from the contact and motivation which care or awareness will bring.

Health Problems

Finally, the seat of quiet desperation lies in maintaining mental and physical health. With age there is more susceptibility to certain diseases of a mental and physical nature. Cancer, heart disease, senility, arterial disorders, and brain damage are the most frequent causes of death. Mental illness as a result of disease or advancing age also takes its toll. Is the picture as black as has been painted? In some instances, yes! However, with increased public awareness of the problems that the aging individual faces there has been a demand that this age group receive the attention and the services which it needs. That it may again be a producing segment of the population, if not economically perhaps culturally or spiritually, is a vital aspect of the fight to recognize the older adult in this society.

While it is valid to say that certain declines with age are inevitable, such declines are usually unimportant. For example, it makes little difference whether or not a man can lift as heavy a weight at 65 as he could at 25, or that he runs slowly or not at all. In this culture, mechanical contrivances for locomotion have long since replaced foot power. Besides, the normal gait at any age in a mature society is the walk. Sensory inadequacy at advanced ages may be offset through the marvels of science which allow the adult to see and hear better than he did without glasses or hearing aid. Technological advancements have produced innovations in time and space control which almost omit physical strain from employment. Air conditioning and thermostatic controls regulate heat and cold problems in the home as well as in the place of employment.

Much may be said for the older adult who has little need of others for his personal maintenance. Such individuals are independent of others, show relatively little signs of advancing years, and are living symbols for vigorous life in the twelve to twenty years of life expectancy after retirement. The science of medicine has done much to reduce the problem of poor health among the aging. New advances are winning the battle for increased prolongation of life with better health. As science pushes back the frontiers of the unknown, it will surely find remedies for the diseases which now account for most morbidity at advanced ages.

The Inhibition of Deterioration

The aging individual finds that he has more leisure on his hands than he has ever experienced. How shall he satisfy the innate desire to achieve when the central focus of life has been denied him? With increasing automation and decreasing skill required in the complex varieties of vocations, except in service fields, there remains little to fulfill the need to create. Where this intrinsic value is reduced because the individual never, or rarely, sees the finished product of his labor, other interests must be found to provide satisfaction.

Recreational activities may well be the basis upon which opportunities for a satisfying social and emotional life will be built. Studies are available which indicate that persons who have some interest which involves them in satisfying activities are healthier mentally and have adjusted to the process of aging with little or no emotional upset (1). The salient factor which appears to determine whether or not the deteriorations of physical and psychological functions can be inhibited is active interest in varied experiences. Activity is the key to prolonged and worthwhile living.

Age has its handicaps, but the individual who intelligently handles a growing physiological decline by forgetting it in the process of stimulating absorption in satisfying activities has a better chance of negating these subtle infirmities. Interest, which compels attention away from the self and outward toward others, is the method by which the everyday anxieties of the flesh may be ignored. It is unfortunate that this society in which we live is grounded upon the Calvinistic tradition of work as the centrality of life. All else under such an ethic is castigated. Thus, leisure and activities which are associated with it, *i.e.*, recreational experiences, are looked upon with suspicion. A society which professes to be the most leisure minded in the world still looks upon recreational activities as something which carries a moral taint.

Only when a new set of value judgments have been initiated will the older adult actually feel and enjoy the satisfactions which recreational participation provides the individual. Too long has the specter of suspicion been cast upon recreational pursuits. Here is the perfect means for instilling new life into the aging person. The development of hobbies, social activities, service projects, and other activities are fundamentally what the individual needs if he wants to obtain satisfaction in life. Many people have not

had the chance to learn or adequately perform such activities during their work lives. In retirement it may be too late. Something has to be done in order to tap this vital resource which has long been overlooked. Society is missing a talented reserve by not utilizing its senior citizens.

Responsibility of Public Agencies

Broad and varied interests usually mean a fuller, richer, and more satisfying life. The public departments of recreational service are responsible for providing opportunity for this richer existence. They are charged with the obligation of organizing and administering programs of varied activities whch will meet the needs of all people. As such they must be prepared to offer activities which will satisfy the aging individual.

Exercise both of a mental and physical nature introduces the aspect of activity to the individual. With activity there is less likelihood of personal feelings of inadequacy and boredom. The public recreational agency must offer a balanced program of physical and mental experiences which will successfully arouse the individual from apathy and promote a redevelopment of awareness in the things that he is able to do. Limitations of the aged have to be taken into consideration. Certainly no one advocates activity which is beyond the physical or mental capacity of any individual, regardless of age.

Active individuals show vigor in living even when they are physically incapacitated. Those who are not so handicapped are erect in their carriage, have better muscle tonus, and are less apt to show the strains of physiological decline. They are more alert mentally and tend to participate in experiences which generate continued self- realization and individual self-esteem. Planned recreational activity stimulates the individual to work toward goals and provokes interest in achievement. Where others are concerned the activities within a recreational program may promote new acquaintenships, with the attendant comforts of security and confidence developed from discovering that one is a part of a group which needs the individual as much as he needs it. The hope and interest which a well planned and operated program can stimulate creates a revitalized lease on life for those who partake of the experience.

Physical deteriorations may not be radically modified through participation within recreational activities, but the acceptance of such limitations and the relegation of them to insignificance in daily living is part of the value which such a program offers. Instead of indecision there is an apparent change in attitude toward the self. Depreciation of performance is downgraded as the individual realizes that he has skills and talents which have not been called on for years. He is made aware that there is much which he can do. In an accepting atmosphere the insecurity of isolation is gone. The individual rediscovers himself as an individual worthy of respect. Self-confidence, poise, and direction are the correlates of continual participation.

As the individual finds himself included in the activities of the group, there is a tendency for him to experience a sense of belonging and a renewed sense of being wanted. A planned recreational program, supervised by professional leadership, enables the older person to work within the restrictions of his abilities. Even more important, however, latent talents are exploited. The individual's strengths, rather than his weaknesses, are focused upon. Purposeful activity, congenial companionship, and the realization that one may still perform in ways that are useful to a larger world, than any four walls can contain, aids the individual in understanding himself more completely and accepting certain limitations over which he has no control.

Participation in recreational activities offers diverse experiences for creativity, education, socialization, and release from strain. Such activities are emotionally satisfying. The sense of well being which is developed as a result of such participation is radically illustrated as fears, doubts, frustrations, and boredom are overcome. Recognition, status, acceptance, and companionship are the values which one may receive within the permissive environment of a public recreational activity program.

Concentration on Individual Needs

The planned program of any public recreational service agency operating for the aging person in the community is concerned with meeting human needs. Such a program may meet certain physiological needs for activity, but fundamentally it is vitally involved with meeting such psychological and social needs which have their foundation in both physiological as well as societal pressures.

Recreational pursuits, especially those which constitute socialization, creativity, educational achievement, and aesthetic experiences offer stimulating and emotionally satisfying activities beneficial to the individual's self concept. Interaction with peers who have the same needs and limitations produces an acceptance of one's self and develops individual status. The recreational program includes group, individual, passive activity, cultural, educational, physical, mental, social, and artistic activities. The wide range of possible activities allows the individual to choose

an activity where he finds himself most capable. Working from the known to the unknown activities, the individual's interest patterns are broadened in order to have a richer and more meaningful experience.

In the highly permissive environment which pervades the recreational agency program, the aging individual learns to participate to the fullest extent of his capabilities. More important than mere participation in activity is the sure knowledge that one belongs to a specific group. Companionship and abiding interest are the basis upon which stronger ties are made. When the individual realizes that others are interested in his needs and problems he responds by becoming slightly more outgoing in his ways. The highly conservative air of interest only in the self tends to disappear.

As the older adult comes to be a part of a group and takes an interest in new activities, or in those which he had skill but which he had let slide, his demeanor is more alert. Awakened interest in varied activities spurs new effort which denies introspection in the small ills and twinges of age. The sense of feeling well is achieved when there is little concentration upon the miseries of too much self and more upon activities in which others may also participate.

Preoccupation with bodily deterioration, fancied slights, or feelings of hostility and insecurity is displaced by active participation in social recreational experiences. As the older person gradually assumes his place within the agency setting, he finds that others share the needs which he alone thought were his problems. The desperate search for security, an aim in life, and the feeling that one is doing something significant and not merely wasting time may be solved within the public recreational agency program. This is how the older adult's needs are met.

Services of the Public Recreational Department

The public recreational agency, while aware of physiological deterioration, ill health, financial need, and housing deficits of the older adult, has not the facilities to provide for these lacks. Where such problems are apparent, the best method which the recreational agency utilizes is referral to such specialized organizations which are created to meet these specific needs. The recreational program serves to inhibit mental deterioration through interest and effort and possibly those physical deteriorations which come from the disuse of various organic functions. Provision of recreational services give opportunity to partake of diverse activities particularly organized to appeal to the older adult.

Another obligation of the public recreational agency is to sell such activities to the older person. Many aged persons feel that they cannot get to centers where such experiences are provided. It therefore behooves the agency to either give transportation to such individuals or disperse such activities so that they are convenient and accessible to the older citizen. Individuals must be made aware of the fact that such experiences are open to them, they will be with others who have the same backgrounds or whose interests lie along the same lines.

Most important, however, is to emphasize the point that the individual will have a part in planning any of the activities which will be programmed. Too often, the older adult is treated like an infant. This does more to discourage than to encourage. The older adult is an adult, first and foremost, with the additional problem of failing physical facility. Care must be taken to discover what it is that will involve the individual and stimulate continuing interest in the program. Whatever it is that brings new light to tired eyes, new lift to dragging feet, and new purpose to flagging hope must be a vital part of the recreational agency's program.

The recreational agency seeks to serve all of the people. To do this it must make frequent appraisal and analysis of what human beings want to do when they want to do it. All ages have particular needs which recreational experiences may satisfy. The aged person is no different in that he also has basic needs. Recreational activities may help to meet those needs by providing an atmosphere, socialization, varied projects, and the knowledge that one is secure among friends and accepted as an individual with all the rights and respect which human dignity requires. To maintain an active interest in life, one must have something to live for. In many instances there is nothing to live for after retirement. Recreational interests can create significant experiences, provide vivid color to leisure pursuits, fashion a central aim, and make life worth living again.

1. Conkey, F., Adaptions of Fifty Men and Fifty Women to Old Age. *Journal of Home Economics*, Vol. II, 1933, pp. 387-389.

Please Patronize
Our Advertisers

PYLON—Cont'd from P. 160

it requires skill and added muscular effort, disturbs the rhythm of the gait and is kinetically unsound; but it can be done.

With the addition of the weights, such faults are eliminated. The amputee can start to walk with an unlocked knee without worry as soon as he has acquired enough balance, strength, endurance; sometimes as early as a week after walking on a pylon. By placing the opening of the kneelock that early in the program, we can train both pylon walking and a good swing phase with knee flexion simultaneously, thereby eliminating an "additional training period." It adds the advantage of shortening the period of the stiff-knee gait, let alone forming a habit of it. In brief, the amputee is being prepared for walking with a final prosthesis *before* instead of *after* receiving it.

The third factor, the unlocking of the knee itself, is quite simple of course. Using glide locks on our pylons, we fasten the locking ring above the interlocking steel bars of the knee hinge with a piece of adhesive.

Conclusion

If this training is meticulously executed, the amputee will step from his pylon into the prosthesis without apprehension or fear. Due to the proper preparation of muscles, joints, stump formation and shrinkage, the final limb fits usually so well that the notorious changes mentioned earlier have become more or less a matter of the past. The patient will be able to adjust within one or two exercise periods so efficiently that he will become ready for discharge on the same or the next day after receiving his new prosthesis.

If the amputee, moreover, has difficulties, actual or potential, they will become manifest during pylon training; be they cardiac, pulmonary, peripheral vascular, or metabolic. Thus, the pylon phase of our amputee program becomes also the proving ground for the patient to demonstrate what he is capable of accomplishing, for us as therapists, orthotists or physicians, the testing field of observation and appraisal. In addition, the pylon can also be used as a quasi-permanent walking device in those cases in which the medical picture would preclude a final prosthesis as questionable or undesirable and/or economic conditions would make it unattainable or unwise.

In whichever manner the pylon is being used, it is an instrument of versatility and utility for everyone involved in amputee training. It is of truly priceless value to the elderly person, the "geriatric amputee," if you will, whose numbers are increasing at an alarming rate. This discussion, therefore, is also a plea for the more wide-spread use of it. We hope the pylon will receive the recognition it deserves in the training of the amputee.

REFERENCES

1. DeLorme, Thomas L., Restoration of Muscle Power by Heavy-Resistance Exercises, *Journal of Bone and Joint Surgery*, 27:645-667, Oct. 1945,
2. Clarke, H. Harrison, *Cable Tension Strength Tests*. Chicopee, Mass., 1953. Brown-Murphy Co.
3. Leighton, Jack R., Simple Objective and Reliable Measure of Flexibility, *Research Quarterly*, 12:205-216, May, 1942.

EFFECT OF—Cont'd from P. 162

men unless they have an intense desire to develop muscular strength and endurance. The system demands a sort of fortitude that is not required when a heavy resistance system of exercise is used. As in all endurance exercises there is a distress near the end of maximum effort to which the individual must become inured. It is necessary to supply generous amounts of encouragement in order to extract full effort from those who are not strongly motivated for improvement.

Conclusions.

1. A modified system of low-resistance, high-repetition p.r.e. produces statistically significant increases in strength without interfering significantly with flexibility.

2. The variability of individual response to low-resistance, high-repetition p.r.e. needs to be investigated from the standpoint of changes in strength and flexibility.

REFERENCES

1. Blashy, M.R.M., and Henry V. Morelewicz, Lower Extremity Protheses for Patients past Fifty. *Arch. Phys. Med. & Rehab.*, 39:8, 1958.
2. Slocum, Donald B., *An Atlas of Amputations*. St. Louis, The C. V. Mosby Co., 1949.
3. Steindler, Arthur, *Kinesiology of the Human Body*, Springfield, Ill., Charles C. Thomas, 1955.
4. Rusk, Howard, *Rehabilitation Medicine*. St. Louis, The C. V. Mosby Co., 1958.
5. Licht, Sidney, *Physical Medicine Library*. New Haven, Conn., E. Licht, 1958.
6. Personal communication, U.C.L.A., March, 1959.
7. Klopsteg, P. E., and P. D. Wilson, *Human Limbs and their Substitutes*. New York, McGraw-Hill, 1954.

CORRECTION

In our July-August, 1960 issue, we published a series of talks under the general heading 'Projecting Curricula Development in School and Hospital Situations." One of these talks, "The Training of Physical Educators for Rehabilitation," p. 100-101, by Rudolph Jahn contained a paragraph which was an uncredited quotation. The paragraph beginning "Regardless of all the associated medical courses" on p. 101 and continuing to the end of the article should have been credited to Shelton, Robert E., Curriculum Problems in a University Corrective Therapy Program. *Jnl. Assoc. Phys. & Ment. Rehab.*, 13:5:150, Sept.-Oct., 1959. The *Journal* regrets this deletion.

"From Other Journals"

W. Raab, Metabolic Protection and Reconditioning of the Heart Muscle Through Habitual Physical Exercise. *Annals of Internal Medicine*, 53:87-105, July, 1960.

Athlete's heart is now recognized as highly efficient and resistant to stress. The prevalence of effective antiadrenergic neuro-vegetative regulatory mechanisms in highly trained individuals suggests that a deficiency of these mechanisms may be involved in the origin of various functional and degenerative cardiac anomalies. A total of 360 healthy men of widely varying exercise habits were examined, and a proportionate relationship between the degree of habitual physical exercise and the neuro-vegetative state of the heart was found. The high vagal and/or sympathoinhibitory tone of athletes is not a preexisting constitutional trait, but largely disappears after the cessation of regular exercising and can be acquired by relatively short training periods. Smoking habits do not noticeably affect the basic neuro-vegetative cardiac status. A healthy myocardium is vigorously stimulated but rarely injured during the process of exercising. This may account for the lower and later incidence of cardiac disease in physically active as compared with sedentary people. It may be assumed that vigorous physical exercise habits (together with dietary precautions and avoidance of excessive emotional stress) contribute to the maintenance of myocardial health by preventing an undue sympatho-adrenergic overactivity in the heart muscle, the crucial feature of "loafer's heart." Endurance sports are more likely to develop a high cardiac cholinergic and/or sympatho-inhibitory tone than are strength and skill sports. Work tolerance testing is desirable before exposing older persons to the possible hazards of increasingly vigorous systematic exercise training. Successful mass reconditioning programs are being carried out in a large scale in Central Europe and the Soviet Union, but the United States lags far behind.

Carleton B. Chapman, Joseph N. Fisher, and Brian J. Sproule, Behavior of Stroke Volume at Rest and During Exercise in Human Beings. *Journal of Clinical Investigation*, 39:1208-1213, August, 1960.

Starling's law states that physical exercise brings about increased venous return and increased diastolic filling of the heart, thus producing sufficient increase in the energy of contraction to drive increased volumes of blood into the aorta with each stroke. This has been questioned by Rushmer, who argues that stroke volume need not change significantly with exercise. Studies were made of 26 adult men. It was found that stroke volume increases with increasing levels of exercise, although the relation is not linear.

A. Holmgren, *et al.*, Effect of Training on Work Capacity, Total Hemoglobin, Blood Volume, Heart Volume and Pulse Rate in Recumbent and Upright Positions. *Acta Physiologica Scandinavica*, 50:72-83, 1960.

Athletes with great physical work capacity are capable of a greater maximal oxygen uptake during exertion than are other comparable individuals. Their greater work capacity corresponds to a greater blood volume and total amount of hemoglobin. Consequently, in relation to the total amount of hemoglobin they should have the same work capacity as untrained persons. Their greater blood volume and heart volume appear to be a direct result of physical training.

One group of subjects intermittently practiced gymnastics and cross-country for a long term; the other practiced skiing daily for a short term. Both groups showed significant increases in work capacity, total hemoglobin, and blood volume. The relationship between work capacity and blood volume is casual, and the increases were greater after continuous short term training. After continuous short term training work capacity increased more proportionately than did blood volume. This might be due to a more efficient peripheral circulatory adaptation to muscular work, resulting in a larger utilization of the blood oxygen than before training. Physical exercise of long daily duration but moderate intensity seems to have less effect than training of shorter daily duration with varying tempo up to exhaustion.

Carl Binger, Editorial. *Psychosomatic Medicine*, XXII:249-250, July August, 1960.

Psychosomatic medicine is another name for comprehensive or holistic medicine. It includes the individual's reactions to his illness and its implications for his personal and social life as well as the effects of these upon the functioning of his body. There is no such thing as psychosomatic disease. In some diseases emotional elements are more obvious than in others, and these are conventionally termed psychosomatic. The goal of psychosomatic research is to explore and clarify the interrelationship of psychological processes and physiological and pathological ones. What needs to be brought home to students is the multiple etiology in most diseases and the fact that the distinction between so-called "organic" and "functional" ones is arbitrary and unsound. The important thing is to determine how great are the psychogenic influences and what can be done about them to help the patient. It is essential to understand the physiological and anatomical pathways through which these influences are expressed. The content of psychosomatic medicine can be best taught by achieving a working cooperation between the departments of psychiatry, medicine, surgery, and the specialties. Psychiatry will have to take the lead in this.

James Cyriax, The Use and Misuse of Physiotherapy. *American Practitioner and Digest of Treatment*, 11:620, July, 1960.

There are a number of techniques of physiotherapy. Indications for and technics of exercise are largely agreed upon. Massage is potentially valuable. Percussion may dislodge secretions and ease painful amputation stumps. When voluntary contraction is difficult to obtain, muscles with normal innervation can be stimulated with advantage by faradic current. Interrupted galvanism is useful in muscles paralyzed by nervous defect. There is no indication for the use of sinusoidal current. Radiant heat rays are valueless and should be banned. Infra-red rays have no medical indication. The only real indication for short wave diathermy is sepsis. Ultrasonic waves are no improvement on short wave diathermy except that they soften scar tissue. Hydrotherapy is valuable, especially when there is much muscle weakness. Ultra-violet light is useful in dermatology. Wax baths provide an effective way of heating hands and feet and would be useful were there conditions in which such warmth did lasting good. No condition benefits from ionization.

S. Minc, The Civilized Pattern of Human Activity and Coronary Heart Disease. *Medical Journal of Australia*, II:87-91, July 16, 1960.

In ischaemic heart disease the metabolic requirements of the myocardium are not met by the coronary blood supply. The major demands on cardiovascular performance come from neuromuscular activity. It may be assumed that some factors in western life impair, prevent, or delay homeostatic adjustment of the cardio-coronary system to activity. Activity introduces some factors which act mechanically, some which act chemically, and some which act through the autonomic nervous system. Since the behavior of the autonomic nervous system is the only variable among the three, it is logical that it is the one associated with the prevalence of ischaemic heart disease in our culture.

The degree of activity of the autonomic nervous system is related to emotional tone. During our biological past the emotional element led to appropriate action, but civilized man reacts to cerebral rather than to emotional stimuli. We have emotion without action and action without emotion. It has long been postulated that many organic diseases are due to the rational inhibition of emotionally prepared actions, but the opposite is also true. Because of cultural factors, the civilized pattern of activity is characterized by long-term motivation with a long-term program, regulation of current activities by intellectual choice, and inhibition of emotional reactivity during action. For the ordinary worker there is no rewarding feeling of creative achievement. The only reason for extra effort is extra payment. The emotional attitude toward an activity may be negative or positive, but is mostly neutral. There is no emotional upheaval to set the body in physiological readiness for action. Thus the autonomic nervous system lacks one of its stimuli to adjust the internal economy to the external activities.

The specific physiological pattern of cardio-coronary homeostasis is disturbed by our "unnatural" conditions of activity. Under "natural" conditions emotional stimulus is an adequate stimulus for both neuromuscular activity and cardiovascular adaptation. Emotional stimulus for action is related to basic motivational drives and differs from these only quantitatively. In our culture lack of emotional stimulus results in less integration of the autonomic nervous system into the body activity; there is less efficient cardiovascular and coronary adaptation. Maladaptation imposed by western culture and not psychological or physical constitution is the cause of the increasing incidence of coronary heart disease.

P. F. Iampietro, *et al.*, Heat Production from Shivering. *Journal of Applied Physiology*, 15:632-634, July, 1960.

A number of young men were exposed nude to various combinations of temperature and windspeed. Even when there was no noticeable shivering, there was an increase in body heat production. The greatest individual heat production from shivering was 442 Cal/hr., or about 5 times the resting rate. Heat production was relatively small when windspeeds were low. Probably a static, insulating film of air surrounds the body when windspeed is low.

P. J. R. Nichols, Short-Leg Syndrome. *British Medical Journal*, 5189:1863-1865, June 18, 1960.

Only differences of 11 mm. or more in leg length are statistically significant in relation to clinical symptoms. Differences of ½" or more may be accepted as diagnostically significant. In patients suffering from this condition the shoulder is held lower on the side of the short leg, the hip is less prominent, there is a loss of the hollow of the flank, the gluteal fold is lower, there is a compensatory scoliosis and tilt of the pelvis. Low backache and pain in the short leg may occur and may be aggravated by minor injury, especially a strain caused by lifting. Treatment is by an appropriate shoe-raise. Response is usually good, but may depend on the patient's age and the mobility of the lumbar spine.

Robert D. Coye and Ronald R. Rosandich, Proteinuria During the 24-Hour Period Following Exercise. *Journal of Applied Physiology*, 15:592-594, July, 1960.

The urine of 10 university football players was collected before and after a practice game, and after the end of football practice. A considerable increase in protein excretion was observed during the 24-hour period following exercise. The mechanism of post-exercise proteinuria is unexplained. There may be two phases: an initial phase of heavy proteinuria related to increased permeability of the glomerulus, and a second longer phase during which less protein is excreted and which may result from delayed repair of a glomerular defect or from impaired tubular reabsorption of the filtered protein following renal ischemia.

Unless noted otherwise, all abstracts have been prepared by Philip J. Rasch, Ph.D.

Book Reviews

Recreation Activities for the Handicapped, by Fredrick M. Chapman. (New York: Ronald Press Co., 1960. 309 pp. $5.75.)

This is a well organized, simply written book concerned with the leadership and activities of a recreational program for the handicapped. Personnel in all rehabilitation areas of hospital work may find this material of value in refreshing old, and presenting new ideas for programming.

The book is divided into two parts. The first is concerned with the behavior patterns of the handicapped individual and methods of helping him in the solution of some of his problems; the second "—contains descriptions of over 250 activities divided among ten program areas—arts and crafts, audio-visual activities, dance, dramatics, hobbies and special interests, music, nature and outing activities, social recreation activities, special events and sports and games." The activities are prescribed for one or more of six diagnostic groups—the aged, children, general medical and surgical, neuropsychiatric, mentally retarded and tubercular.

The indices, a general index and one of diagnostic groups, are provided to help simplify methods of locating and selecting program information.

The book is a worthwhile compilation of source material and could be found to be valuable to a departmental library.

HJB

Vision of the Aging Patient: An Optometric Symposium, edited by Monroe J. Hirsch and Ralph E. Wick. (Philadelphia: Chilton Co., 1960. 328 pp. $7.50.)

The increasing longevity of the American people has forced an awareness of the various aspects of aging on those engaged in rehabilitation. One of these aspects is vision. The editors of this text have brought together the contributions of fifteen outstanding specialists. It is heartening to note that for matters not indigenous to opthamalogy the editors have solicited contributions from those best qualified in such areas. Thus a psychologist writes about the psychology of aging, a professor of psychophysiological optics writes about visual acuity, and a librarian suggests further readings.

Although written primarily for opthamalogists, the chapters on anatomical and physiological changes associated with age, the psychological aspects of aging, and the effect of age on visual acuity are good general reference works. Of particular interest to readers of this *Journal* should be the chapters on social and vocational rehabilitation of the blind and partially sighted older patient, the bedfast or invalided patient, and the economic aspects and old age assistance programs.

WRP

Physical Activity in Modern Living by Wayne Van Huss et al. (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1960. 122 pp. Paperbound, $2.50.)

This is a text written for the student in his first college physical education course and has as its stated objective his motivation toward life-long physical maintenance. It is well illustrated, and the numerous graphs contribute toward a better understanding of the text. Like any book written by several authors, some of the material is presented more concisely and is better documented than others. The plan of the book appears to be for the student to appraise his physical status and then to select those physical education activities which best enable him to maintain a physical status which is above average. The physical inventory is based on measures of somatotype, grip strength, the three-minute step test, trunk flexibility, trunk extension, the half-mile run, push-ups, chin-ups, vertical jump, agility run, anthropometric measures, a posture picture, and a questionnaire to determine how well one can relax. The importance of these items in daily living, longevity, and morbidity has not been demonstrated, the validity of some are lacking or undetermined, and the use of others is of questionable value, even when performed by highly skilled and experienced interpreters. If a measure of body imagery only is desired, the inclusion of a test similar to the Body Image Projective Test of Hunt and Weber (*J. Proj. Tech.*, 1960) would be more appropriate than the Sheldon somatotype. More important, however, is what the student does with the results of these physical tests. Norms are not provided for all the items of the physical inventory and the recommended physical profile drawn from those which are provided is very nearly impossible to interpret. The effects of height, weight, or body constitution were not considered in establishing these norms. Thus, it is that the 100th percentile shows a weight of 249 pounds, a half-mile run time of 130 seconds, 20 chin-ups, a vertical jump of 30.5 inches, and a post-exercise pulse rate of 78 per minute. The text implies a value judgment for the profile which is wholly inappropriate. In the present instance, the 75th percentile is not always "better" than 75 percent of the sample. The student, after completion of the tests and construction of the profile, still has no knowledge upon which to base his selection of physical activities.

The text attempts to give meaning to the required physical education programs and, in a broader sense, to justify the role of physical education in our society. A rigorous revision with particular attention to accuracy of details, a clearer organization of material, and the use of experts for the discussions of the social and emotional impacts of physical education would make this a very valuable text. As it is, it presents much useful information, often in a clear and original manner.

WRP

The Secrets of Judo, by Jiichi Watanabe and Lindy Avakian. (Rutland, Vermont: Charles E. Tuttle Company, 1960. 186 pp. $3.75.)

This is a very interesting attempt to teach judo on the basis of the body mechanics which underlie the various movements. Nearly half of the text is devoted to a simple explanation of the mechanical principles involved; the other half presents common maneuvers and discusses the body dynamics which are involved in their successful execution. For the teacher or the serious student of judo who desires to know the why of what he does, this book is a must. College students in kinesiology or body mechanics will find it a useful reference manual, as the book shows many practical applications of concepts which often seem purely theoretical.

Like all Tuttle books, this is a superior example of publishing. Numerous line drawings and photographs illustrate the text, and an index is included. The binding is attractive, and—what many readers may consider best of all—the price is very moderate for a work of this quality.

PJR

The Kybernetics of Natural Systems, by D. and K. Stanley-Jones. (New York: Pergamon Press, 1960. 145 pp. $6.50.)

Stanley-Jones employs the term "Kybernetics" to designate a non-mathematical approach to the study of the patterns of control of living systems. It is his thesis that the same laws apply to biological systems as to mechanical structures. The basic premise is that changes in output cause the system to make corresponding but inverse changes (negative feed-back) in the input. At every over-shooting, a stabilizing feed-back acting in the opposite direction is introduced. Homeostasis is thus characterized by oscillation about a central position. A time lag in the controls or failure of the negative feedback to function may result in such ills as the tabetic gait and nystagmus. A breakdown in the system or reversal of the feed-back results in a runaway to maximum, as in mania, or to zero, as in catatonia. Similarly the orthosympathetic network of the autonomic nervous system is governed by the parasympathetic network through a pattern of negative feed-back. The "fight or flight" response represents a runaway to maximum. In the last chapter Stanley-Jones very briefly discusses the kybernetics of sociology.

It is evident that hypotheses of this kind offer theoretical models for the understanding of certain biological mechanisms. It will be interesting to see whether kybernetics becomes part of the equipment of the biologist.

PJR

Athletic Training and Conditioning, by O. William Dayton. (New York: The Ronald Press Company, 1960. 390 pp. $6.00.)

This book is typical of those written by the "old line" athletic trainers who are not physical educators or corrective therapists, and shows the usual strengths and weaknesses of such books. About two-thirds of the text is devoted to the treatment of athletic injuries. The section displays a wealth of practical experience and should be a useful addition to any trainer's professional library.

Inevitably, however, this means that the approach to athletic conditioning as a whole is undesirably narrowed, and the text is not well designed for use in the classroom. There are almost no citations to the literature, even when direct quotations are given or documentation is definitely required, as in the case of the statement "Deep knee bends will stretch the medial collateral ligaments as much as 8 per cent and the lateral collateral ligament as much as 10 per cent." Deep knee bends are condemned, but there is no mention of the squat or of the Klein exercises for the prevention and rehabilitation of knee injuries. The declarations that "Weight training consists of performing exercises with weights at a fast rate," and that "As ability increases, the number of repetitions is also increased but the weight remains the same" introduce the reader to a thoroughly unsatisfactory discussion of progressive resistance programs. It is surprising to learn that a man may be too short or too tall to acquire skill in athletics; one wonders where this leaves former world champion weight lifter Joe De Pietro, an achondroplastic dwarf, and "Wilt the Stilt" Chamberlain and John Thomas. Warts *may* disappear of their own volution, but also they may not. A painful condition at the external condyle of the elbow is described as "golfer's elbow." In medical literature "golfer's elbow" involves the area of the internal epicondyle; cases of involvement of the external epicondyle are known as "tennis elbow." The latter term does not appear in the text. The anatomical drawings are very crude and provide only a general idea of the muscle presented. There is no discussion of ergogenic aids, which is certainly the most controversial subject in athletic training at the present time.

The text contains a large number of illustrations and an index. If it were revised in conjunction with a physical educator or other academically trained person it could be developed into one of the best practical manuals on the market. At present, however, Morehouse and Rasch's *Scientific Basis of Athletic Training* remains the only book offering the "whole man" approach typical of the thinking of corrective therapists.

WRP

Principles and Techniques of Supervision in Physical Education, by L. W. Irwin and J. H. Humphrey. (Dubuque, Ia.: Wm. C. Brown Co., 1960. 348 pp. $4.50.)

This is a reprint of a text which originally was published in 1954 by C. V. Mosby. The material is of a nature which is relatively unaffected by time, so the principles and techniques under discussion should be pertinent in the present text as they were originally. The authors state that the book is intended as both a text and reference work. It is well suited for these purposes.

WRP

Philosophy of Recreation and Leisure, by Jay B. Nash. Dubuque: Wm. C. Brown Co., 1960. 222 pp. $3.50.)

This is an offset reprint of a work which was originally published by C. V. Mosby Company in 1953. The author states that he has drawn heavily from written sources from Socrates to Gulick and the text is replete with poetic illustrations, some of which are the author's own. There are no photographic or line illustrations, but it is doubtful if a text of this nature would benefit from them.

WRP

BOOKS RECEIVED

Handcrafts for the Homebound Handicapped, by Mildred Kroll Rich. (Springfield, Illinois: Charles C. Thomas, 1960. 104 pp.)

This book should be of interest to occupational therapists, but falls outside the interests of corrective therapists.

Illusions and Delusions of the Supernatural and the Occult, by D. H. Rawcliffe. (New York: Dover Publications, Inc., 1959. 551 pp. $2.00. Paper.)

Reprint of an attack on all forms of supposedly occult phenomena.

Health and Physical Education Microcard Bulletin, 1 October 1960. (Eugene: University of Oregon, 1960. 52 pp. Paper. Free.)

Latest edition of a standard reference guide.

More reviews appear on P. 183.

News and Comments

ELECTRONIC DEVICE CONTROLS HYPOTHERMIA

Through the cooperation of a now-retired Army officer, Lt. Col. Ollie J. Allen of Fort Gordon, Ga., doctors at the Augusta, Ga., Veterans Administration hospital have an "electronic brain" to control more accurately the lowering of body temperature in treatment of patients. This principle of cooling the entire body, known as hypothermia, is used to afford survival for patients with certain types of injury and disease and in surgery. The chilling reduces the need of the tissues for oxygen and makes possible halting the blood circulation briefly so that operations can be performed inside the heart.

Although the new control device has been tested only with animals so far, it has proved extremely accurate. It promises to enable doctors to carry out hypothermia more efficiently and more safely, even for long periods.

The apparatus generally used circulates ice water through a rubberized blanket enveloping the patient's body. Each time the water temperature is raised or lowered to counteract changes observed in the patient, a temperature control dial must be reset manually. Thus the exact and safe lowered body temperature is difficult to maintain over a period of days, despite meticulous care.

Colonel Allen, until recently executive officer of the Army's Southeastern Signal School at Fort Gordon, volunteered to build for Dr. C. Martin Rhode, chief of the Augusta VA hospital's surgical service, an "electronic brain" that would maintain the desired temperature by electronic monitoring. The colonel put in some 600 hours of his off-duty time constructing the device, using parts gathered from scattered points over Eastern Georgia. Then numerous test trials of the apparatus were conducted by Colonel Allen, Dr. Rhode, and the doctor's research assistant, Von V. Pittman.

The new instrument consists of a refrigeration and heating unit, a hydraulic-servo pump mechanism, and an "electronic-brain." With it, body temperature can be lowered to the desired level and maintained for days with a variation of less than one degree.

The apparatus monitors an instrument which constantly measures the body temperature of the patient in hypothermia, and, should this change as little as two-tenths of one degree, automatically adjusts the temperature of the circulating water as needed.

Prior to induction of hypothermia, the doctor can dial the desired low temperature level and the period of time in which to reach it. Upon completion of the hypothermic period, he merely re-dials the subject's normal temperature, or any desired in-between temperature, and the number of hours (up to 15) required for the warming period or return to normal.

Dr. Rhode feels that, should more exhaustive studies confirm the preliminary tests, the "brain-controlled" apparatus might be used for certain patients with severe head and brain injury, to provide a safe and prolonged period of lowered body temperature in addition to other forms of treatment. Brain tissue is quickly destroyed by lack of oxygen and by injury, even for short periods of time; however, it withstands these insults better under hypothermic conditions precisely maintained for days.

Colonel Allen has signed over his prototype drawings and patent rights of the apparatus to public domain, so that additional units may more readily become available for other hospitals.

He retired from the Army on June 28, after 27 years in that service, and accepted a position with Westinghouse Electric in Baltimore, working on the Polaris missile-firing submarine.

The story of the development of the control device for hypothermia has been recorded by the television studios of the Army Southeastern Signal School at Fort Gordon, on a 30-minute video tape and documentary film.

DR. MEYER APPOINTED

Appointment of Joe Meyer, Ph.D., as chief of the medical research laboratories division of the Veterans Administration has been announced by the VA. Dr. Meyer has been serving as chief of the medical research laboratories of the Houston, Tex., VA hospital and associate professor of biochemistry at Baylor University College of Medicine, since 1959.

In his new position in the VA Department of Medicine and Surgery in Washington, D. C., he will coordinate the laboratory activities of the agency's nationwide medical research program. These include work in research laboratories of 128 VA hospitals, clinics, centers, and regional offices and in special laboratories at 72 of these stations.

He succeeds Harold F. Weiler, who left the VA to accept a position with the Army Research Office in Arlington, Va.

PIONEER IN PARAPLEGIA HONORED

Dr. Ernest Bors, chief of the spinal cord injury service of the Long Beach, Calif., Veterans Administration hospital, has been honored by the VA for outstanding service to the paraplegic veterans of the United States. The commendation, signed by Dr. William S. Middleton, the VA's chief medical director in Washington, D.C., cited Dr. Bors for achievement in rehabilitation of these seriously handicapped VA patients over a 14-year period.

Dr. Bors first began seeing paraplegic patients as an Army medical officer at Hammond General Hospital, Modesto, Calif., in 1944. Under his leadership there has developed a spinal cord injury treatment program at the Long Beach VA hospital which could well serve as a model for the medical world.

The center was built to specification within the new eight million dollar wing of the hospital.

Subject Index - - Volume XIV

ABSTRACTS

- A -

Anatomy
Muscle Mechanics, Some Aspects of (Strange, F.G.St.C.) 4:113, July.
Orphan of Medicine, the (Du Vries, H. L.) 2:45, March.

Anthropometry
Body Build of Male Homosexuals (Coppen, A. J.) 2:45, March.
Fat-Free Body, Estimation of the Constancy of Density of (Werdein, E. J. & Kyle, L. H.) 4:115, July.

Arthritis
Arthritis, Treatment and Rehabilitation of, Physcial Medicine in (Twombley, G.) 1:20, Jan.

Athletic Injuries
Adductor Muscle Injuries in Bowlers (Hoon, J. R.) 2:45, March.
Boxing and Face Lacerations, 3:82, May.
Herniae, Causation of, by Weight Lifting (Davis, P. R.) 2:44, March.
Ligamentous Disruption of the Knee (Ritchey, S. J.) 2:45, March.
Medial Epicondylitis (Marmor, L.) 1:20, Jan.
Skiing Injuries, Mechanisms Involved in (Erskine, L. A.) 1:21, Jan.

- B -

Boxing
Boxing and Face Lacerations, 3:82, May.
Medical Officers of Schools Association 4:114, July.

- C -

Circulation
Atherosclerosis, Experimental, Accelerating Effect of Muscular Exercise On (McAlister, F. F.) 2:45, March.
Blood Lactate During Recovery from Sprint Runs (Andersen, K. L., Bolstad, A. & Sand, S.) 3:83, May.
Blood Volume in Man, Central, Effects of Exercise on (Braunwald, E., Kelly, E. R. & Bullock, F. A.) 4:113, July.
Cardiac Infarction, Acute, Physical Activity of Patients After the Onset of (Jarvinen, K. A. J.) 4:113, July.
Cardiovascular System, Effects of Muscular Work and Heat on the (Brouha, L.) 3:82, May.
Cholesterol: the Perplexing Metabolite (Saunders, J. F.) 4:113, July.
Concentration and Turnover of Plasma Nonesterified Fatty Acids, Effect of Exercise on (Friedberg, S. J.) 4:114, July.
Stroke Volume, Behavior of, at Rest and During Exercise in Human Beings (Chapman, C. B., Fisher, J. N. & Sproule, B. J.) 6:174, Nov.

- E -

Exercise
Exercise, Effect of, on Central Blood Volume in Man (Braunwald, E., Kelly, E. R. & Bullock, F.A.) 4:113, July.
Exercise, Effect of, on the Concentration and Turnover of Plasma Nonesterified Fatty Acids (Friedberg, S. J.) 4:114, July.
Exercise, Muscular, Accelerating Effect of, on Experimental Atherosclerosis (McAllister, F. F.) 2:45, March.
Exercise, Proteinuria During the 24-Hour Period Following (Coye, R.D. & Rosandich, R.R.) 6:175, Nov.
Exercise Therapy 5:142, Sept.
Exercises, Yogi, Some, Electro-Physiological Correlates of (Bagchi, B. K. & Wenger, M. A.) 1:19, Jan.
Exercises, Brief Maximal Isotonic, Observations on the Clinical Effects of (Rose, D. L.) 5:142, Sept.
Mechanical Efficiency, Influence of Test Pauses on (Christensen, E. H., Hedman, R. & Holmdahl, I.) 4:114, July.
Metabolic Protection and Reconditioning of the Heart Muscle Through Habitual Physical Exercise (W. Raab) 6:174, Nov.
Muscle Training by Static, Concentric and Eccentric Contractions (Petersen, F. B.) 5:142, Sept.
Muscular Work, Intermittent (Astrand, I., Astrand, P. O. Christensen, E. H. & Hedman, R.) 5:142, Sept.
Physical Activity of Patients After the Onset of Acute Cardiac Infarction (Jarvinen, K. A. J.) 4:113, July.
Strength, Rapidity of Movement and Endurance, Development of, in the Course of Training in Various Forms of Athletic Activity (Iakoviev, N. N.) 5:143, Sept.
Training, Effect of, on Work Capacity, Total Hemoglobin, Blood Volume, Heart Volume and Pulse Rate in Recumbent and Upright Positions (Holmgren, A.) 6:174, Nov.

- M -

Medicine
Anesthesia, Statistics and Biometrics in (Martin, S. J.) 2:46, March.
Blood Fibrinolytic Activity, Effect of Beer on (Fearnley, G. R.) 2:46, March.
Disease, Coronary Heart, Civilized Pattern of Human Activity and (Minic, S.) 6:175, Nov.
Disease, Infectious, Nutritional Aspects of (Garber, E. D.) 3:82, May.
Male Sex Hormones (Bishop P. M. F.) 2:46, March.
Man, Disease, and the Social Environment (Volkart, E. H.) 3:82, May.
Psychosomatic Medicine (Binger, C.) 6:174, Nov.
Species Differences (Orloff, M. J.) 1:21, Jan.

- N -

Nutrition
Coffee Break, the (Felton, J. S.) 1:20, Jan.
Diet and Weight-Reduction in the Obese (Pilkington, T. E.) 4:115, July.
Food Faddism (Engel, R. W.) 2:46, March.
Nutritional Aspects of Infectious Disease (Garber, E. D.) 3:82, May.
Vitamin E For Athletes (Johnston, W.) 4:114, July.

- P -

Physical Education
Judo (Hodkinson, H. M., Morris-Owen, R. M. & Williams, H. M.) 4:113, July.
Judo, Studies on the Choking in, Particularly on its Electroencephalogram (Suzuki, K.) 4:114, July.
Physical Education, Future of, the (Jokl, E.) 2:46, March.
Training the Sportsman, Scientific Trends in (Carlile, F). 1:20, Jan.
Weight Training Program, Comparative Study of the effects on Jr. H. S. Boys (Pitman, J.) 2:45, March.

Physical Fitness
Physical Fitness, on the Features in, of Champions in Weight Lifting (Bando, E., Takayama, T., Miyamoto, H., Ushikubo, S. & Sasada, T.) 3:83, May.
Shoes and Feet, 3:83, May.
Weight Training Program, Comparative Study of the Effects of on Jr. H. S. Boys (Pitman, J.) 2:45, March.
Yogi, Functional Capacities of a (Rasch, P. J.) 1:21, Jan.

Physical Medicine
Anterior Tibial Syndrome (Grunwald, A. & Silberman, Z.) 4:113, July.
Arthritis, Treatment and Rehabilitation of, Physical Medicine in (Twombley, G.) 1:20, Jan.
Exercise, Immobilization and Intermittent Stretching, Effect of, on Strength of Knee Ligaments of Albino Rats (Rasch, P. J., Maniscalco, R., Pierson, W. R. & Logan, G. A.) 3:83, May.
Physiotherapy, Use and Misuse of (Cyriax, J.) 6:174, Nov.
Short Leg Syndrome (Nichols, P.J.R.) 6:175, Nov.
Temperature and Volume Diminution, Coefficient of, of the Muscle and Myosin Threads When Passively Stretched (Tigye, J. & Sebes, T. A.) 1:21, Jan.
Tennis Elbow (Wall, J.) 4:114, July.

Physiology
Caloric Expenditure of Normal and Obese Subjects During Standard Work Test (McKee, W. P. & Bolinger, R. E.) 3:82, May.
Cardiovascular System, Effects of Muscular Work and Heat on the (Brouha, L.) 3:82, May.
Competitive Conditions, Effect of, on Respiratory Exchange, Pulse Rate, Arterial Pressure and Efficiency in Athletes (Smirnov, K. M.) 2:45, March.
Heat Production from Shivering (Iampietro, P.F.) 6:175, Nov.

Insulin Action, Glucose Transport Theory of (Goldstein, M. S.) 4:114, July.
Isometric Muscular Effort, Effects of Variations in Intensity and Frequency of on the Development of Static Muscular Strength of Prepubescent Males (Rarick, G. L. & Larsen, G. L.) 2:46, March.
Lung Volumes of Singers (Heller, S. S., Hicks, W. R. & Root, W. S.) 2:45, March.
Lungs, on Exercise, Increase in Diffusing Capacity of the (MacNamara, J., Prime, F. J. & Sinclair, J. D.) 3:83, May.
Serum Cholesterol in Rabbits, Influence of Water Deprivation on (Altschul, R. & Smart, T. A.) 1:21, Jan.
Weight Lifting, Electrogram Changes Produced by Training in (Stepanov, A. S.) 2:46, March.

Psychiatry
Activity Programs, a Comparison of Group-Centered and Individual Centered (Efron, H. Y., Marks, H. K. & Hall, R.) 1:21, Jan.
Placebo Effect in the History of Medical Treatment: Implications for Psychiatry (Shapiro, A. K.) 1:19, Jan.

Psychology
Basic Tendencies, Life's, Theoretical Observations About (Buhler, C.) 1:20, Jan.
Brain and Personality, 4:115, July.
Masculinity and Smoking (Seltzer, C. C.) 2:44, March.
Musical Creativeness and Emotional Disturbance (Sherwin, A. C.) 2:46, March.
Smoking and Personality (Eysenck, H. J.) 4:113, July.

- R -

Rehabilitation
Physical Therapy, Development of, as a Profession, Through Research and Publication (Worthingham, C.) 5:143, Sept.

- S -

Sports Medicine
Athletes, Vitamin E for (Johnston, W.) 4:114, July.
Boxing and Face Lacerations, 3:82, May.
Knockout and Syncope in Professional Boxing (Espinosa, L. J. & Iborra, J. E.) 3:82, May.
Medical Officers of Schools Association 4:114, July.
Physical Fitness, on the Features in, of Champions in Weight Lifting (Bando, E., Takayama, T., Miyamoto, H., Ushikubo, S. & Sasada, T.) 3:83 May.
Sports Medicine, Biblographies and Periodicals of, Since WW II (Klaus, E. J.) 4:114, July.

ARTICLES

- A -

Ambulation
Ambulation Aids, Measuring Instruments for: the Ambulaidometer (Hooker, R. F. & Blashy, M. R. M.) 3:69, May.
Ambulation With Pylons and the 'Faulty' Gait (Blashy, M.R.M., Tanzine, J. & Oldham, J.) 6:158, Nov.

Athletic Injuries
Ankle Exercise Program, Pre-Season, Effects on Prevention of Ankle Injuries in High School Basketball Players (Rhodes, E., Van Huss, W. D. & Nelson, R.) 3:78, May.
Knee Injury in Athletics, Dynamics of Force as Applied to, and as Related to the Supporting Strength of the Involved Musculature, a Preliminary Study of (Klein, K. K.) 2:35, March.

- B -

Bibliography
U. S. Sports Medicine Literature—1959 (Rasch, P. J., Pierson, W. R. & O'Connell, E. R.) 2:47, March.

Body Mechanics
Body Mechanics, Proper, and Patient Self-Care, a Training Course Outline for Hospital Personnel in (Fowler, R. G., Weber, B. H. & Koos, W.) 2:33, March.

- C -

Corrective Therapy
Corrective Therapy in Geriatrics (Van Schoick, J.) 2:41, March.
Curricula Development in School and Hospital Situations, Projecting (Klafs, C. E., Bok, F. J., Jahn, R. & Young, C. H.) 4:100, July.
Expanding Corrective Therapy Vistas (Rosenberg, L.) 1:9, Jan.
Muscular Strength and Endurance Scores, Some, of Psychiatric Patients (Hodgdon, R. E. & Riemer, D.) 2:38, March.
Physical Reactivation as a Treatment Approach for Elderly Deteriorated Neuropsychiatric Patients (Atoman, D., Jurcisin, G. & Halliday, R. W.) 4:103, July.
Work Therapy for the Handicapped (Vogel J.) 6:165, Nov.

- E -

Education
Curricula Development in School and Hospital Situations, Projecting (Klafs, C. E., Bok, F. J., Jahn, R. & Young, C. H.) 4:100, July.
Training Course Outline for Hospital Personnel in Proper Body Mechanics and Patient Self-Care (Fowler, R. G., Weber, B. H. & Koos, W.) 2:33, March.

Exercise
Dynamics of Force as Applied to Knee Injury in Athletics and as Related to the Supporting Strength of the Involved Musculature, a Preliminary Study of (Klein, K. K.) 2:35, March.
Exercise, Prolonged, Physiological Response to (Beckner, G. L. & Winsor, T.) 4:106, July.
Exercise, Progressive Resistance, Low-Resistance, High-Repetition, Effect of Upon Selected Measures of Strength and Flexibility (Wickstrom, R.L.) 6:161, Nov.
Hypertrophy or the Skeletal Muscle (Siebert, W.W.) 6:153, Nov.
Strength Test, Total Proportional, Norms for the (Rasch, P. J., Pierson, W. R., O'Connell, E. R. & Hunt, M. B.) 3:67 ,May.
Weight Lifting in Athletics, Role of (Pierson, W. R.) 5:136, Sept.

- G -

Geriatrics
Aging, the Physiology of (Stafford, C. E.) 1:5, Jan.
Geriatrics, Corrective Therapy in (Van Schoick, J.) 2:41, March.
Recreation Service for the Aging (Shivers, J.S.) 6:168, Nov.

- H -

Health Education
Dysmenorrhea, Teen-Age; a Problem and a Challenge (Golub, L. S., Menduke, H., Mueller, G. W. & Christaldi, J.) 1:11, Jan.

- N -

Neurological
Epileptic, New Horizons in Rehabilitation of (Risch, F.) 5:129, Sept.
Spinal Cord Injured Patients, Rehabilitation of (Friedland, F.) 4:95 July.

- P -

Physical Education
High School Basketball Players, Effects of Pre-Season Ankle Exercise Program on Prevention of Ankle Injuries (Rhodes, E., Van Huss, W. D. & Nelson, R.) 3:78, May.
Teen-Age Dysmenorrhea: a Problem and a Challenge (Golub, L. S., Menduke, H., Mueller, G. W. & Christaldi, J.) 1:11, Jan.

Physical Fitness
Physical Fitness and Susceptibility to Infections (Jokl, E.) 3:71, May.
Rotometer, the and its Use by Disabled Students (Tipton, C. M. & Hall, D. M.) 3:72, May.
Strength Test, Total Proportional, Norms for the (Rasch, P. J., Pierson, W. R., O'Connell, E. R. & Hunt, M. B.) 3:67, May.

Physiology
Physiology of Aging, the (Stafford, C. E.) 1:5, Jan.
Physiological Response to Prolonged Exercise (Beckner, G. L. & Winsor, T.) 4:106, July.
Skin Temperature, Local, Effect of Local Isometric Muscular Activity on (O'Connell, E. R. 3:74, May.

Psychiatric
Neuropsychiatric Patients, Elderly Deteriorated, Physical Reactivation as a Treatment Approach for (Atoman, D., Jurcisin, G. & Halliday, R. W.) 4:103, July.
Psychiatric Patients, Some Muscular Strength and Endurance Scores of (Hodgdon, R. E. & Riemer, D.) 2:38, March.
Schizophrenic Patients Hospitalized, Chronic, Therapeutic Program for (Appell, W. T. & Reis, W. H.) 1:14, Jan.

Psychology
Personality Attributes. Some, of

Champion Amateur Wrestlers (Rasch, P. J. & Hunt, M. B.) 6:163, Nov.

- R -

Rehabilitation

Rehabilitation, Medical, Scope and Objectives of (Radzyminski, S. F.) 5:132, Sept.
Rehabilitation of Spinal Cord Injured Patients (Friedland, F.) 4:95, July.
Rehabilitation of the Epileptic, New Horizons in (Risch, F.) 5:129, Sept.
Rehabilitation Opportunities in Industrial Medicine (St. Louis, F. G.) 5:134, Sept.
Rehabilitation, Vocational, in the Veterans Administration (Kraabel, T. O.) 5:138, Sept.
Wheelchair, How to Prescribe a (Nyquist, R. H. & Bors, E.) 5:125, Sept.

- S -

Sports Medicine

Sports Medicine Literature, U. S. — 1959 (Rasch, P. J., Pierson, W. R. & O'Connell, E. R.) 2:47, March.

BOOK REVIEWS

- A -

Anatomy, Cates' Primary (Basmajian, J. V.) 2:50, March.
Anatomy, Descriptive and Surgical, a Brief Account of Henry Gray and His (Goss, C. M.) 2:51, March.
Anatomy, Functional, of the Limbs and Back (Hollinshead, W. H.) 3:86, May.
Aphasia Handbook for Adults and Children (Agronowitz., A. & McKeown, M. R.) 2:51, March.
Athletic Directors National Conference. 2:52, March.
Athletic Training and Conditioning (Dayton, O. W.) 6:176, Nov.

- B -

Body Building, Modern (Johnson, D. L. & Heidenstom, O.) 3:84, May.
Body Mechanics, Proper, and Patient Self-Care, Guide to, 4:116, July.
Body, Structure and Function of the (Anthony, C. P.) 5:144, Sept.

- C -

Conditioning Exercises, Games, Tests (Oermann, K. C. H., Young, C. H. & Gary, M. J.) 3:84, May.

- E -

Exercise and Fitness, 4:116, July.
Exercise and Sports, Science and Medicine of (Johnson, W. R.) 5:145, Sept.
Extrasensory Perception, Ciba Foundation Symposium (Wolstenholme, G. E. W. & Miller, E. C. P.) 4:116, July.

- F -

Fencing, How to Improve your (Garrett, M. R.) 1:25, Jan.
Foot Ailments, Physiotherapy for (Stirling, J. H.) 5:144, Sept.
Foot and the Ankle, the (Lewin, P.) 3:85, May.
Football Fatalities, 28th Annual Survey of (Eastwood, F. R.) 4:116, July.

- G -

Game Book, How we do It, 3:85, May.
Gastric Juice and the Physiology of Digestion, Experiments and Observations on (Beaumont, W.) 5:143, Sept.
Guidance of the Young Child (Langford, L. M.) 4:115, July.

- H -

Health and Figure Control, Modern (Heidenstom, O.) 4:115, July.
Healthier Living, Essentials of (Schrifferes, J. J.) 3:84, May.
Human Motion, Efficiency of (Broer, M. R.) 4:116, July.

- J -

Judo Secrets of (Watanabe, J. & Avakian, L.) 6:176, Nov.

- K -

Karate: the Art of "Empty Hand" Fighting (Nishiyama, H. & Brown, R. C.) 2:51, March.
Kinesiology (Wells, K. F.) 4:116, July.
Kybernetics of Natural Systems, the (Stanley-Jones, D. & K.) 6:176, Nov.

- L -

Low Back Pain, Elongation Treatment of (Hassard, G. H. & Reed, C. L.) 3:84, May.

- M -

Medical History, Source Book of (Clendening, L.) 5:144, Sept.
Medicine, Aerospace, Lectures in, 5:145, Sept.
Medicine and Surgery, Classics of (Camac, C. N. B.) 5:143, Sept.

- N -

Nutrition, Teaching, in the Elementary School (Banks, M. A. & Dunham, M.) 3:86, May.

- P -

Physical Activity in Modern Living (Van Huss, W.) 6:176, Nov.
Physical Education, Foundations of (Bucher, C. A.) 5:145, Sept.
Physical Education Literature, Vol IV, Index and Abstracts of Foreign (Olson, H. W.) 2:5., March.
Physical Education, Measurement and Evaluation in (Scott, M. E. & French, E.) 3:85, May.
Physical Education Principles and Techniques of Supervision in (Irwin, L. W. & Humphrey, J. H.) 6:177, Nov.
Physiology of Motion (Duchenne, G. B.) 1:25, Jan.
Posture, Active Alerted (Tucker, W. E.) 5:145, Sept.
Posture, Man's: Electromyographic Studies (Joseph, J.) 5:144, Sept.
Postural Fitness—Significance and Variances (Lowman, C. L. & Young, C. H.) 3:85, May.
Prison, Social Organization of the, Theoretical Studies in (Cloward, R.) 4:116, July.
Projective Techniques, Creative Variations in the (Harrower, M.) 5:144, Sept.
Prosthetic Principles—Above Knee Amputations (Anderson, M. H., Bray, J. J. & Hennessy, C. A.) 2:50, March.

- Q -

Quackery, the Golden Age of (Holbrook, S. H.) 2:50, March.

- R -

Recreation Activities for the Handicapped (Chapman, F. M.) 6:175, Nov.
Recreation and Leisure Philosophy of (Nash, J. B.) 6:177, Nov.
Research, Completed, in Health, Physical Education, Recreation (Hubbard, A. W. & Weiss, R. A.) 2:52, March.
Research, Completed, in Health, Physical Education, Recreation (Hubbard, A. W. & Weiss, R. A.) 5:144, Sept.
Research in Health, an Inventory of Social and Economic (Seacat, M. S.) 2:50, March.
Research Methods in Health, Physical Education and Recreation (Scott, M. G.) 1:25, Jan.

- S -

Sex in Psychoanalysis (Ferenczi, S.); Psychoanalysis, the Development of (Ferenczi, S. & Rank, O.) 4:116, July.
Speech Book, Clown Family, the (Pollock, M. P. & Pollock, M. S.) 5:143, Sept.
Statistics for the Behavioral Sciences, Nonparametric (Siegel, S.) 2:52, March.
Statistics in Research (Ostle, B.) 3:85, May.
Statistics, Nonparametric and Shortcut, in the Social, Biological and Medical Sciences (Tate, M. W. & Clelland, R. C.) 3:84, May.

- T -

Track and Field Athletics (Bresnehan, G. T., Tuttle, W. W. & Cretzmeyer, F. X.) 2:52, March.
Track and Field for Coach and Athlete (Mortensen, J. P. & Cooper, J. M.) 4:115, July.

- V -

Varicose Veins, on the Causation of (Cleave, T. L.) 5:145, Sept.
Vision of the Aging Patient: an Optometric Symposium (Hirsch, M. J. & Wick, R. E.) 6:175, Nov.

- W -

Weight Training and Weight Lifting for Physical Fitness in Nebraska High Schools (Higgins, R. L.) 3:84, May.
Weight Training Manual, Athletic, 2:51, March.
Westerner's Brand Book, the (Meadows, D.) 2:51, March.

- Y -

Yoga, a Scientific Evaluation of (Behanan, K. T.) 5:144, Sept.

Author Index - - Volume XIV

- A -

Agronowitz, A. & McKeown, M. R., 2:51, March (BR)
Altschul, R. & Smart, T. A., 1:21, Jan. (abs)
Andersen, K. L., Bolstad, A. & Sand, S., 3:83, May (abs)
Anderson, M. H., Bray, J. J. & Hennessy, C. A., 2:50 March (BR)
Anthony, C. P., 5:144, Sept. (BR)
Appell, W. T. & Reis, W. H., 1:14, Jan.
Astrand, I., Astrand, P-O, Christensen, E. H. & Hedman, R., 5:142, Sept. (abs)
Astrand P-O, Astrand, I., Christensen, E. H. & Hedman, R., 5:142, Sept. (abs)
Atoman, D., Jurcisin, G. & Halliday, R. W., 4:103, July.

- B -

Bagchi, B. K. & Wenger, M. A., 1:19, Jan. (abs)
Bando, E., Takayama, T., Miryamoto, H., Ushikubo, S. & Sasada, T., 3:83, May (abs)
Banks, M. A. & Dunham, M., 3:86, May (BR)
Basmajian, J. V., 2:50, March (BR)
Beaumont, W., 5:143, Sept. (BR)
Behanan, K. T., 5:144, Sept. (BR)
Beckner, G. L. & Winsor, T., 4:106, July.
Binger, C., 6:175 Nov. (abs)
Bishop, P. M. F., 2:46, March (abs)
Blashy, M. R. M. & Hooker, R. F., 3:69, May.
Blashy M. R. M., Tanzine J. & Oldham, J., 6:158, Nov.
Bok, F. J., Klafs, C. E., Jahn, R. & Young, C. H., 4:100, July.
Bolinger R. E. & McKee W. P., 3:82, May (abs)
Bolstad, A., Andersen, K. L. & Sand, S., 3:83, May (abs)
Bors, E. & Nyquist, R. H., 5:125, Sept.
Bray, J. J., Anderson, M. H. & Hennessy, C. A., 2:50, March (BR)
Bresnehan G. T., Tuttle, W. W. & Cretzmeyer, F. X., 2:52, March (BR)
Braunwald, E., Kelly, E. R. & Bullock, F. A., 4:113, July (abs)
Broer, M. R., 4:116, July (BR)
Brouha, L., 3:82, May (abs)
Brown, R. C. & Nishayama, H., 2:51, March (BR)
Bucher, C. A., 5:145, Sept. (BR)
Buhler, C., 1:20, Jan. (abs)
Bullock, F. A., Braunwald, E. & Kelly, E. R., 4:113, July (abs)

- C -

Camac, C. N. B., 5:143, Sept. (BR)
Carlile, F., 1:20, Jan. (abs)
Chapman C. B., Fisher, J. N. & Sproule, B. J., 6:174, Nov. (abs)
Chapman, F. M., 6:175, Nov. (BR)
Christaldi, J., Golub, L. S., Menduke, H. & Mueller G. W., 1:11, Jan.
Christensen, E. H., Astrand, I., Astrand, P-O, & Hedman, R., 5:142, Sept. (abs)
Christensen, E. H., Hedman, R. & Holmdahl, I., 4:114, July (abs)
Cleave, T. L., 5:145, Sept. (BR)
Clelland, R. C. & Tate, M. W., 3:84, May, (BR)
Clendening, L., 5:144, Sept. (BR)
Cloward, R., 4:117, July (BR)
Cooper, J. M. & Mortensen, J. P., 4:115, July (BR)
Coppen, A. J., 2:45, March (abs)
Coye R. D. & Rosandich, R. R., 6:175, Nov. (abs)
Cretzmeyer, F. X., Tuttle, W. W. & Bresnehan, G. T., 2:52, March (BR)
Cyriax, J., 6:174, Nov. (abs)

- D -

Davis, P. R , 2:44, March (abs)
Dayton, O. W., 6:176 Nov. (BR)
Duchenne, G. B., 1:25, Jan. (BR)
Dunham, M. & Banks, M. A., 3:86, May (BR)
Du Vries, H. L., 2:45, March (abs)

- E -

Eastwood, F. R., 4:117, July (BR)
Efron, H. Y., Marks, H. K. & Hall, R., 1:21, Jan. (abs)
Engel, R. W., 2:46, March (abs)
Erskine, L. A., 1:21, Jan. (abs)
Espinosa, L. J. & Iborra, J. E., 3:82, May (abs)
Eysenck, H. J., 4:113, July (abs)

- F -

Fearnley, G. R., 2:46, March (abs)
Felton, J. S., 1:20, Jan. (abs)
Ferenczi, S., 4:116, July (BR)
Ferenczi, S. & Rank, O., 4:116, July (BR)
Fisher J. N., Chapman, C. B. & Sproule, B. J., 6:174, Nov. (abs)
Fowler, R. G., Weber, B. H. & Koos, W., 2:33, March.
French, E. & Scott, M. G., 3:85, May (BR)
Friedberg, S. J., 4:114, July (abs)
Friedland, F., 4:95, July.

- G -

Garber, E. D., 3:82, May (abs)
Garrett, M. R., 1:25, Jan. (BR)
Gary, M. J., Oermann, K. C. H. & Young, C. H., 3:84, May (BR)
Goldstein, M. S., 4:114, July (abs)
Golub, L. S., Menduke, H. Mueller, G. W. & Christaldi, J., 1:11, Jan.
Goss, C. M., 2:51, March (BR)
Grunwald, A. & Silberman, Z., 4:113, July (abs)

- H -

Hall, D. M. & Tipton, C. M., 3:72, May.
Hall, R., Efron, H. Y. & Marks, H. K., 1:21, Jan. (abs)
Halliday, R. W., Atoman, D. & Jurcisin, G., 4:103, July.
Harrower, M., 5:144, Sept. (BR)
Hassard, G. H. & Reed, C. L., 3:84, May (BR)
Hedman, R., Holmdale, I & Christensen, E. H., 4:114, July (abs)
Hedman, R. Astrand, I., Astrand, P-O & Christensen, E. H., 5:142, Sept. (abs)
Heidenstom, O., 4:115, July (BR)
Heidenstom, O. & Johnson, D. L., 3:84, May (BR)
Heller, S. S., Hicks, W. R. & Root, W. S., 2:45, March (abs)
Hicks, W. R., Heller, S. S. & Root, W. S., 2:45, March (abs)
Higgins, R. L., 3:84, May (BR)
Hirsch M. J. & Wick, R. E. 6:175, Nov. (BR)
Hodgdon, R. E. & Riemer, D., 2:38, March.
Hodkinson, H. M., Morris-Owen,. R. M. & Williams, H. M., 4:113, July (abs)
Holbrook, S. H., 2:50, March (BR)
Hollinshead, W. H., 3:86, May (BR)
Holmdahl, I., Hedman, R. & Christensen, E. H., 4:114, July (abs)
Holmgren, A., 6:174, Nov. (abs)
Hooker, R. F. & Blashy, M. R. M., 3:69, May.
Hoon, J. R., 2:45, March (abs)
Hubbard, A. W. & Weiss, R. A., 5:144, Sept. (BR)
Hubbard, A. W. & Weiss, R. A., 2:52, March (BR)
Humphrey, J. H. & Irwin, L. W., 6:177, Nov. (BR)
Hunt, M. B. & Rasch, P. J., 6:163, Nov.
Hunt, M. B., Rasch, P. J., Pierson, W. R. & O'Connell, E. R., 3:67, May.

- I -

Iakoviev N. N., 5:143, Sept. (abs)
Iampietro P. F., 6:175, Nov. (abs)
Iborra, J. E. & Espinosa, L. J., 3:82, May (abs)
Irwin, L. W. & Humphrey, J. H., 6:177 Nov. (BR)

- J -

Jahn, R., Klafs, C. E., Bok, F. J. & Young, C. H., 4:100, July.
Jarvinen K. A. J., 4:113, July (abs)
Johnson, D. L. & Heidenstom, O., 3:84, May (BR)
Johnson, W. R., 5:145, Sept. (BR)
Johnston, W., 4:114, July (abs)
Jokl, E., 2:46 March (abs)
Jokl, E., 3:71, May.
Joseph J., 5:144, Sept. (BR)
Jurcisin, G., Atoman, D. & Halliday, R. W., 4:103, July.

- K -

Kelly, E. R., Braunwald, E. & Bullock, F. A., 4:113, July (abs)
Klafs, C. E., Bok, F. J., Jahn, R. & Young C. H., 4:100, July.
Klaus, E. J., 4:114, July (abs)
Klein, K. K., 2:35, March.
Koos, W., Fowler, R. G. & Weber, B. H., 2:33, March.

Kraabel, T. O., 5:138, Sept.
Kyle, L. H. & Werdein, E. J., 4:115, July (abs)

- L -

Langford, L. M., 4:115, July (BR)
Larsen, G. L. & Rarick, G. L., 2:46, March (abs)
Lewin, P., 3:85, May (BR)
Logan, G. L., Rasch, P. J., Maniscalco, R. & Pierson, W. R., 3:83, May (abs)
Lowman C. L. & Young, C. H., 3:85, May (BR)

- M -

MacNamara, J., Prime, F. J. & Sinclair, J. D., 3:83, May (abs)
McAllister, F. F., 2:45, March (abs)
McKee, W. P. & Bolinger, R. E., 3:82, May (abs)
McKeown, M. R. & Agronowitz, A., 2:51, March (BR)
Maniscalco, R., Rasch, P. J., Pierson, W. R. & Logan, G. A., 3:83, May (abs)
Marks H. K., Efron, H. Y. & Hall, R., 1:21, Jan. (abs)
Marmor, L., 1:20, Jan. (abs)
Martin, S. J., 2:45, March (abs)
Meadows, D., 2:51, March (BR)
Menduke, H., Golub, L. S., Mueller, G. W. & Christaldi, J., 1:11, Jan.
Millar, E. C. P. & Wolstenholme, G. E. W., 4:116, July (BR)
Minic, S., 6:175, Nov. (abs)
Miryamoto, H., Takayama, T., Bando, E., Ushikubo, S. & Sasada, T., 3:83, May (abs)
Morris-Owen, R. M., Hodkinson, H. M. & Williams, H. M., 4:113, July (abs)
Mortensen, J. P. & Cooper, J. M., 4:115, (BR)
Mueller, G. W., Golub, L. S., Menduke, H. & Christaldi, J., 1:11, Jan.

- N -

Nash, J. B., 6:177 Nov. (BR)
Nelson, R., Rhodes, E. & Van Huss, W. D., 3:78, May.
Nichols, P. J. R., 6:175, Nov. (abs)
Nishiyama, H. & Brown, R. C., 2:51, March (BR)
Nyquist, R. H. & Bors, E., 5:125, Sept.

- O -

O'Connell, E. R., 3:74, May.
O'Connell, E. R., Rasch, P. J. & Pierson, W. R., 2:47, March.
O"Connell, E. R., Rasch, P. J., Pierson, W. R. & Hunt, M. B., 3:67, May.
Oermann K. C. H., Young, C. H. & Gary, M. J., 3:84, May (BR)
Oldham J., Blashy, M. R. M., & Tanzine, J.) 6:158, Nov.
Olson, H. W., 2:51, March (BR)
Orloff, M. J., 1:21, Jan. (abs)
Ostle, B. 3:85, May (BR)

- P -

Petersen, F. B., 5:142, Sept. (abs)
Pierson, W. R., 5:136, Sept.
Pierson, W. R., Rasch, P. J. & O'Connell, E. R., 2:47, March.
Pierson, W. R., Rasch, P. J., O'Connell, E. R. & Hunt, M. B., 3:67, May.
Pierson, W. R., Maniscalco, R., Rasch, P. J. & Logan, G. A., 3:83, May (abs)
Pilkington T. E., 4:115, July (abs)
Pitman, J., 2:45, March (abs)
Pollock, M. P. & Pollock, M. S., 5:143, Sept. (BR)
Pollock, M. S. & Pollock, M. P., 5:143, Sept. (BR)
Prime, F. J., MacNamara, J. & Sinclair, J. D., 3:83, May (abs)

- R -

Raab, W., 6:174, Nov. (abs)
Radzyminski, S. F., 5:132, Sept.
Rank, O. & Ferenczi, S., 4:116, July (BR)
Rarick, G. L. & Larsen, G. L., 2:46, March (abs)
Rasch, P. J., 1:21, Jan. (abs)
Rasch, P. J. & Hunt, M. B., 6:163, Nov.
Rasch, P. J., Pierson, W. R., O'Connell, E. R. & Hunt, M. B., 3:67, May.
Rasch P. J., Maniscalco, R., Pierson, W. R. & Logan, G. A., 3:83, May (abs)
Reed, C. L. & Hassard, G. H., 3:84, May (BR)
Reis, W. H. & Appell, W. T., 1:14, Jan.
Rhodes, E., Van Huss, W. D. & Nelson, R., 3:78, May.
Riemer, D. & Hodgdon, R. E., 2:38, March.
Risch, F., 5:129, Sept.
Ritchey, S. J., 2:45, March (abs)
Root, W. S., Heller, S. S. & Hicks, W. R., 2:45, March (abs)
Rosandich, R. R. & Coye, R. D., 6:175, Nov. (abs)
Rosenberg, L., 1:9, Jan.

- S -

St. Louis, F. G., 5:134, Sept.
Sand, S., Andersen, K. L. & Bolstad, A., 3:83, May (abs)
Sasada, T., Takayama, T., Bando, E., Miryamoto, H. & Ushikubo, S., 3:83, May (abs)
Saunders, J. P., 4:113, July (abs)
Schrifferes, J. J., 3:84, May (BR)
Scott, M. G., 1:25, Jan. (BR)
Scott, M. G. & French, E., 3:85, May (BR)
Seacat, M. S., 2:50, March (BR)
Sebes, T. A. & Tigye, J., 1:21, Jan. (abs)
Seltzer, C. C., 2:44, March (abs)
Shapiro, A. K., 1:19, Jan. (abs)
Sherwin, A. C., 2:46 March (abs)
Shivers, J. S., 6:168, Nov.
Siebert, W. W., 6:153, Nov.
Siegel, S., 2:52, March (BR)
Sinclair, J. D., MacNamara, J. & Prime, F. J., 3:83, May (abs)
Smart, T. A. & Altschul, R., 1:21, Jan. (abs)
Smirnov, K. M., 2:45, March (abs)
Sproule B. J., Chapman, C. B. & Fisher, J. N., 6:174, Nov. (abs)
Stafford, C. E., 1:5, Jan.
Stanley-Jones, D. & Stanley-Jones, K, 6:176, Nov. (BR)
Stepanov, A. S., 2:46, March (abs)
Stirling, J. H., 5:144, Sept. (BR)
Strange, P. G. St. C., 4:113, July (abs)
Suzuki, K., 4:114, July (abs)

- T -

Takayama, T., Bando, E., Miryamoto, H, Ushikubo, S. & Sasada, T., 3:83, May (abs)
Tanzine, J., Blashy, M. R. M. & Oldham J., 6:158, Nov.
Tate, M. W. & Clelland, R. C., 3:84, May (BR)
Tigye, J. & Sebes, T. A., 1:21, Jan. (abs)
Tipton, C. M. & Hall, D. M., 3:72, May.
Tucker, W. E., 5:145, Sept. (BR)
Tuttle, W. W., Bresnahan, G. T. & Cretzmeyer, F. X., 2:52, March (BR)
Twombley, G., 1:20, Jan. (abs)

- U -

Ushikubo, S., Takayama, T., Bando, E., Miryamoto, H. & Sasada, T., 3:83, May (abs)

- V -

Van Huss, W., 6:176, Nov. (BR)
Van Huss, W. D., Rhodes, E. & Nelson, R., 3:78, May.
Van Schoick, J., 2:41, March.
Vogel, J., 6:165 Nov.
Volkart, E. H., 3:82, May (abs)

- W -

Wall, J., 4:114, July (abs)
Weber B. H., Fowler, R. G. & Koos, W., 2:33, March.
Weiss, R. A. & Hubbard, A. W., 2:52, March (BR)
Weiss, R. A. & Hubbard, A. W., 5:144, Sept. (BR)
Wells, K., 4:117, July (BR)
Wenger, M. A. & Bagchi, B. K., 1:19, Jan. (abs)
Werdein, E. J. & Kyle, L. H., 4:115, July (abs)
Wick, R. E. & Hirsch, M. J., 6:175, Nov. (BR)
Wickstrom R. L., 6:161, Nov.
Williams, H. M., Hodkinson, H. M. & Morris-Owen, R. M., 4:113, July (abs)
Winsor, T. & Beckner, G. L., 4:106, July.
Wolstenholme, G. E. W. & Millar, E. C. P., 4:116, July (BR)
Worthingham, C., 5:143 Sept. (abs)

-Y -

Young, C. H., Klafs, C. E., Bok, F. J. & Jahn, R., 4:100, July.
Young, C. H. & Lowman, C. L., 3:85, May (BR)
Young, C. H., Oermann, K. C. H. & Gary, M. J., 3:84, May (BR)

VA MAINTAINING REGISTRY FOR TB-LIKE DISEASE

The Veterans Administration since January 1, 1960, has registered 710 cases of a tuberculosis-like disease which has come to the attention of physicians in the United States during recent years. As yet the disease has no name more specific than "infections due to unclassified mycobacteria." Doctors are trying to learn more about the bacteria that cause it. The infections closely simulate TB and usually affect the lungs.

Since the prevalence of the disease in this country is unknown, the VA undertook the task of compiling a case register from the agency's hospitals and clinics on a nationwide basis about a year ago.

So far, California has reported the highest number of cases, 95, and New York is second with 87. Tennessee reports 72, Illinois 65, Missouri 64, Texas 56, Kansas 34, Indiana 32, Mississippi 31, Hawaii 23, Kentucky 20, Arizona 17, Minnesota 16, and Michigan 13.

Other states report fewer cases, except for 11 states which report none. These 11 are Colorado, Connecticut, Delaware, Iowa, Maine, Montana, Nevada, New Hampshire, South Dakota, Vermont, and Wyoming. Alaska is the only state that has not been reporting.

The register will be used by the VA for evaluating treatment of these patients and developing new research approaches to the disease.

CITE WORK OF BRACE SHOPS

A few weeks ago at the Veterans Administration hospital in Richmond, Va., former WAVE Ruth Bostian picked up a cup of drinking water in one hand for the first time since she suffered a broken neck in 1949. The reason for her change in physical ability—and, she says, also in her mental attitude—is a pair of braces weighing about 8 ounces each, designed and made for her individually in the hospital's orthopedic brace shop by technician Homer O. Hughes.

"I call them my hands," Miss Bostian said.

The injury to her spinal cord had cost her the use of nearly all her hand and wrist muscles needed for grasping.

The work of the Richmond hospital's orthopedic brace shop for Miss Bostian is representative of what is being done at brace shops of VA hospitals nationwide, to enable disabled veterans to live independently and hold jobs again. Most of the prosthetic appliances must be individually designed and constructed for the veterans.

Mr. Hughes figures he spent 80 hours on Miss Bostian's braces. They are made of aluminum with stainless steel and have leather straps. The VA hospital technician believes working on her braces has taught him how to develop other braces that could prevent twisted arms resulting from wheel chair patients' continual rolling of their chairs.

VA GERIATRIC PATIENTS PRACTICE SELF-GOVERNMENT

Giving aging residents of domiciles an official voice in management of the institutions is good both administratively and medically, Veterans Administration experience suggests. Establishment of members' congresses and councils at VA domiciliary homes has resulted in better communication between the residents and the administrators, therapeutic benefit for the residents, and adoption of valuable suggestions, the VA said.

At the Hot Springs, S.D., VA domiciliary, for example, the venture in self-government for members began in 1959. A constitution and by-laws were prepared by residents and each ward elected delegates to the first congress, which was held in November that year. Officers were elected and the constitution was ratified soon thereafter. Each ward has one regular and one alternate delegate. Ideas and grievances are brought to the delegate, who then presents them to the congress, which is attended by the residents and by staff members including division and service chiefs and subdivision chiefs. No ward meetings in an organized form are held.

As expressed by VA clinical psychologists, therapeutic benefit to the domiciliary resident is recognizable in the active, high degree of their free participation in the congress. Sixty-four precent of the suggestions made by the residents through the congress have been adopted by the management.

NEARLY HALF OF MENTAL PATIENT GROUP ARE FORGOTTEN BY FAMILIES

A large number of the families of Veterans Administration mental hospital patients seldom or never visit or write to the veterans, Dr. J. F. Casey, the VA director of psychiatry and neurology service, has reported.

Dr. Casey cited a recent study made at the Fort Lyon, Colo., VA mental hospital. Of the 646 patients there, 263 (41 percent) had not had a visit from a relative for a year or more, although they had not been home to see their families. A hundred, or 16 percent of the total, had never had a visit from a relative since the start of their hospitalization, which for several was a period of 25 years. Social workers Clarence Groth and Frank Dietrich and staff psychologist Dr. Hiram Gordon, who made the study, said generally the unvisited patients received letters from their relatives infrequently or not at all.

Dr. Casey said there are many patients in VA mental hospitals throughout the country who have little or no contact with their families. Since visits from relatives can be of considerable help in the treatment and rehabilitation of mental patients, the VA is trying to encourage such visits through hospital "family days," hospital newsletters, and similar devices, he said.

Mr. Groth, Dr. Gordon, and Mr. Dietrich formed the impression that after the patient has been in a mental hospital for years, his family establishes an adjustment without him and tends to rationalize that it is better to leave him there. However, they warned against undue criticism of relatives for not visiting the mental patient or not taking him home, since factors such as age of parents and limited family income must be considered.

Reporting on their study in the National Association for Mental Health's journal. *Mental Hygiene*, the Fort Lyon team said the unvisited patients, as compared with other patients of the hospital, were older (mostly over 59) and had been hospitalized longer (about 15 years on the average). In addition, fewer of the unvisited group had ever been married or had relatives living within 500 miles of the hospital. However, 112 of this group did have relatives living within that distance. The three authors suggested that since some veterans are becoming chronic hospital patients while waiting to be taken home by relatives, there should be earlier resort to measures such as foster homes and night hospitals.

The VA is making increasing use of these measures and also is stimulating development of day care centers and halfway houses for its mental patients.

VA MEDICAL RESEARCH CONFERENCE TO BE HELD

Latest findings of Veterans Administration investigations of the causes, nature, and treatment of disease and developments in surgery, drugs, and use of radioisotopes will be reported at the VA's Annual Medical Research Conference in Cincinnati, Ohio, November 29 - December 1. The meeting at the Netherland-Hilton Hotel will be the largest ever for this conference. More than 400 VA physicians and faculty members of medical schools with which VA hospitals are affiliated across the nation are expected to attend.

The William S. Middleton Award, for outstanding achievement in medical research, will be presented for the first time. Founded by friends of Dr. Middleton the VA Chief Medical Director, the award will be made annually at the conference to a VA investigator.

Among the research papers to be presented are reports on development of use of synthetic skin, a new type of artificial lung, natural resistance to cancer, electronic data processing in diagnosis of heart disease, and immunological studies looking forward to transplantation of tissue and organs in humans.

NEW MINIATURE PACEMAKER AIDS CARDIACS

A miniaturized electronic cardiac pacemaker, completely implanted beneath the skin, has been successfully used on patients with complete heart block, according to the Veterans Administration. These patients are those whose own heartbeat is too slow to sustain normal activities. The device was tested for more than two years in the surgical laboratory of the VA hospital in Buffalo, N.Y.

Its development is the result of joint effort between Wilson Greatbatch, M.S., formerly associate professor of electrical engineering at the University of Buffalo, William M. Chardack, M.D., chief of surgery at the Buffalo VA hospital and associate professor of surgery at the University of Buffalo School of Medicine, and Dr. Chardack's associate, Andrew A. Gage, M.D., staff surgeon at the Buffalo VA hospital and associate in surgery at the University of Buffalo School of Medicine. The project was supported in part by the Erie County Heart Association.

The device, including its batteries, is about the size of a pocket watch. Its circuitry is so economical that its estimated lifetime is in excess of five years and may reach six.

It emits a very brief electrical pulse at the rate of one a second which is conducted to the heart muscle by two wires terminating in a bipolar electrode. The electrode is affixed to the surface of the heart muscle.

When the battteries are near the end of their capacity, warning is given by a slow rise in the pulse rate. The pacemaker, located under the skin, is then replaced by a simple operation under local anesthesia without disturbing the electrode on the heart.

Application in patients has been made at the Buffalo VA hospital and the Millard Fillmore Hospital, one of the university-affiliated institutions in the community.

The device has been placed subcutaneously in six patients. All are alive and results have been extremely gratifying in five.

The first and oldest patient to be operated upon was 77 years old. He had sustained numerous falls and a skull fracture during countless Stokes-Adams attacks, a form of recurrent fainting due to slow heart rate.

His heart has now been electrically paced for over five months. He is the first patient in whom a physiological disorder has been successfully corrected on a long-term basis by a completely implanted electronic device independent of outside sources of power.

The youngest patient, in his middle 30s, had been disabled and out of work for approximately two years. He is now completely rehabilitated and attends a vocational school.

VA PLACES MORE MENTAL PATIENTS ON TRIAL VISIT

More than a 100-percent increase in the number of veterans with severe mental illness recovering and leaving Veterans Administration hospitals on trial visit in less than a 10-year period has been reported by the agency. VA said the number of mental patients its hospitals have placed on trial visit to their home communities and to foster homes has increased steadily since 1953.

The 17,330 patients so placed during fiscal 1960 is more than double the 7,617 in fiscal 1953 and may be compared with 16,482 for fiscal 1959, 13,332 for fiscal 1958, 13,200 for fiscal 1957, 12,351 for fiscal 1956, 9,985 in fiscal 1955, and 8,392 in fiscal 1954. Nearly all of the patients leaving the hospitals on trial visit have been treated for severe mental conditions, the VA said.

The average daily load of psychiatric patients in VA hospitals has ranged between 56,000 and 57,000 since 1956, following an increase between 1953 and 1955. Currently, the figure is 56,607.

VA said the increase in patients on trial visit can be attributed to changes in therapies, including use of newer drugs; to increased emphasis by hospitals on helping patients develop new habits of resocialization to prepare for return to community living, and to growth of VA programs in cooperation with community resources which help patients find suitable homes and jobs on release from the hospital.

NEW BOOKS

Successful Wrestling, by Arnold W. Umbach and Warren R. Johnson. (Dubuque: William C. Brown Company, 1960. 256 pp. $4.00.)

Apparently this is a reprint of a book originally published by Mosby in 1953, although the reviewer is not familiar with this earlier edition. Most texts on wrestling are content to give the reader a discussion of holds, counters, and breaks and some hints on training and conditioning. Umbach and Johnson have viewed wrestling as an educational experience and have sought to bring modern scientific knowledge to bear upon its teaching. There are chapters on such topics as "The Role of Wrestling in Education," "Emotional Upset in the Wrestler," "Hazards of Emotional Stress in Coaching," and "Characteristics of Wrestling Champions," all properly documented with citations to the literature and supported by the opinions of a board of experts. Material of this kind should be especially valuable to the young coach.

The section dealing with the art of wrestling is profusely illustrated by simple line drawings. While this may seem rather old-fashioned in this day of photography, it enables the authors to eliminate confusing shadows and distracting details. This section, which comprises a little over half the book, is followed by chapters on methods of coaching, treatment of injuries, administration of competition, and principles of officiating.

As is true of Bresnahan-Tuttle-Cretzmeyer's *Track and Field Athletics* and Mortensen and Cooper's *Track and Field*, this book represents the joint efforts of the coach and academician which this reviewer believes represents the "wave of the future" in coaching manuals. Like them, it is definitely recommended.

Anatomy, by Ernest Gardner, Donald J. Gray, and Ronan O'Rahilly. (Philadelphia: W. B. Saunders Company, 1960. 999 pp. $15.00.)

To therapists who are accustomed to using the standard anatomies, the plan of this book may come as something of a surprise. Instead of dividing the body into systems, as do Gray, Cunningham, Boyd, and Lockhart, the authors divide it into regions—upper limb, lower limb, thorax, abdomen, pelvis, back, and head and neck, in the general style of Grant's *A Method of Anatomy*. This format has definite advantages for those who use the text during dissection procedures, but offers disadvantages for those who simply desire a convenient reference manual to refresh their minds or to clear up detailed points.

The Preface states that the book stresses the relationship between structure and function, but actually it gives about the same amount of attention to function that any standard text does. There are certain inconsistencies in form which are inconvenient. For instance, in some cases the nerve supply is listed under a heading "Nerve Supply and Action"; in others one must hunt through a description of a muscle in order to find it.

The writing is lucid and concise. The new Paris *Nomina Anatomica* has been adopted throughout, whereas such texts as *Gray's Anatomy* have not yet been revised in this respect. Since the earlier terms are not always cited, those who have been out of school for a few years will occasionally encounter unfamiliar nomenclature, but, as the saying goes, they might as well "get with it." A Glossary of Eponymous Terms is included. While the anatomists have decreed that eponyms shall not be used in official nomenclature, such terms as the ligament of Wrisberg and the bundle of His are so familiar that they will be long in dying out, and the Glossary makes a helpful guide to the approved terminology.

The pages are double columned and profusely illustrated with drawings and some photographs, but there is no use of color. The index appears adequate. The text deserves the careful consideration of those interested in a regional anatomy. PJR

Classified Directory

Price of Directory Listing for one Year—6 issues—$10.00

STORES WHERE EVEREST AND JENNINGS PRODUCTS MAY BE PURCHASED

PEACOCK SURGICAL CO., INC., 1235 Texas Ave., Shreveport, Louisiana ..... Day 3-5276—Night 7-4910
THE COLSON-MERRIAM CO., 1623 N. Aisquith St., Baltimore, Maryland ..... Mulberry 2847
AMSTERDAM BROTHERS, 1060 Broad St., Newark 2, New Jersey
E. A. WARNIK CO., Simon Long Building, 50-52 S. Main St., Wilkes-Barre, Pennsylvania 2-8064
MARVIN F. POLLARD CO., 411 W. Broad St., Richmond 20, Virginia
CUSACK-HARMON CO., 111 So. 17th St., Omaha, Neb. 341-5825

STORES WHERE EVEREST AND JENNINGS PRODUCTS MAY BE RENTED OR PURCHASED

ABBEY RENTS, 600 S. Normandie Ave., Los Angeles 5, Calif. ..... DU 4-5292; PL 2-3131; RA 3-9571; HO 2-0924; HE 2-2973; TO 6-1714; OX 8-3339; OR 7-6178; CI 3-2101; PO 3-9105; DI 4-7137; OL 2-2760; SY 5-7041; EX 4-3232; KI 5-1181; NA 9-4138
ABBEY RENTS, 2895 El Cajon Blvd., San Diego 4, Calif. ..... ATwater—1-8151
ABBEY RENTS, 1314 Post Street, San Francisco 9, Calif. ..... GRaystone—4-2525
ABBEY RENTS, 2841 S. El Camino Real, San Mateo, Calif. ..... FIreside—5-5775
ABBEY RENTS, 309 Meridian Road, San Jose, Calif. ..... CYpress 3-1276
ABBEY RENTS, 2315 Broadway, Oakland, Calif. ..... HIgate 4-8181; ELgin 7-3944
ABBEY RENTS, 1827 "J" Street, Sacramento 14, Calif. ..... GIlbert—8-9151
ABBEY RENTS, 1500 N.E. Sandy, Portland 14, Ore. ..... BElmont—4-0274
ABBEY RENTS, 4111 Aurora Ave., Seattle 3, Wash. ..... MElrose—3-3222
ABBEY RENTS, 724 W. Indian School Road, Phoenix, Ariz. ..... CRestwood 7-5744
ABBEY RENTS, 1501 E. Broadway, Tucson, Ariz. ..... MAin 2-8821
ABBEY RENTS, 350 Broadway, Denver 9, Colo. ..... PEarl—3-5521
ABBEY RENTS, 4041 Broadway, Kansas City 11, Mo. ..... JEfferson—1-5200
ABBEY RENTS, 3230 Washington Blvd., St. Louis 3, Mo ..... OL—2-5700; MI—7-3300
ABBEY RENTS, 2220 Lyndale Ave. S., Minneapolis 5, Minn. ..... FR—4-4680; MI—6-6546
ABBEY RENTS, 2824 W. Fond du Lac Ave., Milwaukee 10, Wis. ..... UPtown—3-2000
ABBEY RENTS, 3545 Reading Road, Cincinnati 29, Ohio ..... AVon—1-7000
ABBEY RENTS, 5326 N. Keystone Ave., Indianapolis 20, Ind. ..... CLifford 3-2741
BEST RENTALS, 2025 S. Shepherd Drive, Houston 19, Texas ..... JAckson—3-4416
DOWD CHAIR RENTAL & SALES, 138 South Highland Ave., Pittsburgh, Pa. ..... MOntrose 1-5355
DOWD CHAIR RENTAL & SALES, 4848 Woodward Ave., Detroit 1, Mich. ..... TEmple 3-3490
DOWD CHAIR RENTAL & SALES, 310 N. E. 61st St., Miami, 37, Fla. 89-8561
DOWD CHAIR RENTAL & SALES, 392 Franklin St., Buffalo, New York ..... CLeveland 3335
DOWD CHAIR RENTAL & SALES, (Canada) LTD., 196 George St., Toronto 2, Ontario, Canada ..... EMpire 6-5405
MEDICAL ARTS SUPPLY, 311 State St., S.E., Grand Rapids 3, Mich. ..... GL 9-9413
ELMIRA DRUG & CHEMICAL CO., 368 No. Main St., Elmira, New York 6289
HEYL PHYSICIANS SUPPLY CO., 419 State St., Erie, Pennsylvania 2-6785
BOWERS AMBULANCE SERVICE, 430 E. Pacific Coast Highway, Long Beach 6, California ..... HE 6-9703

MANUFACTURERS OF ORTHOPEDIC AND PROSTHETIC APPLIANCES

BIRMINGHAM ARTIFICIAL LIMB CO., 519 So. 20th St., Birmingham 3, Alabama 3-1786
YALE SURGICAL CO., 1004 Grand Ave., New Haven 11, Connecticut ..... State 7-3005
SNELL ARTIFICIAL LIMB AND BRACE CO., INC., 422 West Market St., Johnson City, Tenn. ..... WA 8-6361

UNCLASSIFIED

NATIONAL SPORTS CO., Mfgrs. of Therapy Gym Mats, 360 Marquette St., Fond du Lac, Wisc. ..... WA 1-8200

FORM 3547 REQUESTED
EDWARD F. MECCHELLA
BOX 478, MONTROSE, N. Y.
RETURN POSTAGE GUARANTEED

HERBERT P DAYKIN
15521 SO PRAIRIE
LAWNDALE CALIF

BULK RATE
U S POSTAGE
PAID
MT. KISCO, N. Y
PERMIT No. 222

LaBERNE THE ORIGINAL WALK-OFF STANDING-TILT TABLE

Model 2101 H

LaBERNE ("Walk-Off") tables built of tubular steel and angle iron finished in Silver Grey Meltone, Mounted on swivel casters with locks, Operated through a gear box and worm, automatically locking the table at any degree of tip. From horizontal to vertical with a calibrated dial showing the degree of tip from 0 to 90.

UTILITY MODEL TABLE is 78" long, 28" wide, and 32" high. Foam top covered with Naugahyde, removable footboard, two 6" restrainer straps, and cervical hook.

LaBERNE TABLES FULLY GUARANTEED FOR 1 YEAR.

Hand Operated—UTILITY MODEL 2101 H $239.50

NEW

MAYO MODEL, 24" wide, 32" high, 78" long, foam top covered with Naugahyde, Removable Footboard and two 6" restrainer straps.

MODEL 2122
Price
$375.00

LaBERNE
UTILITY ELECTRIC
MODEL 1060 E
$395.00

NEW

LOW-BOY, 24" high, 24" wide, 72" long. With Telescopic legs, Foam top covered with Naugahyde, removable footboard, two 6" restrainer Straps.

LOW-BOY MODEL 6200 Price $285.00

LaBERNE MANUFACTURING COMPANY, P. O. Box 5245, COLUMBIA, S. C.